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MILITARY REVIEW

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State Guard Training

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After the declaration of War in April 1917, and the federalization of the National Guard of the several States, the nation suddenly found itself without adequate forces for proper internal security.

Throughout World War I the States never had at their disposal a sufficient number of trained units to deal with sudden emergencies. Congress did eventually authorize 48 battalions of United States guards, but these were still in the nature of Federal forces and not very well suited to execute missions within the scope of the State's territorial police power.

Prior to America's active participation in World War II, therefore, Congress made provision for the establishment of State Guards at the same time the National Guards of the several States were called into active Federal service.

The State Guard was authorized under the provisions of an amendment to the National Defense Act on October 21, 1940, and was given the following mission:

" . . . to provide an adequately trained force for employment within the boundaries and jurisdiction of their respective States as directed by the State Executive or legislature thereof, so as to:

a. Maintain the laws; suppress disorders; and protect the life and property of individuals within the State.

b. Meet such domestic emergencies as may arise within the State including civil disturbances and disasters resulting from both war or other cause. (War Disaster Relief).

c. Guard and protect vital industries, installations, communications and facilities essential to the war effort when other means such as local police or protection by civil guards are deemed inadequate by authorized State or Federal agencies.

d. Prevent or suppress the activities of enemy agents such as fifth columnists and parachute troops either in the absence of, or in support or conjunction with, Federal troops.

e. Cooperate with Federal military authorities in extreme emergencies, especially in information and observation duties at or near frontiers and in the evacuation of civilians.

f. Perform such other duties as were assigned to the National Guard when not in Federal Service."

As can be seen, Congress and the War Department clearly intended that the internal security of the United States during this emergency is not to be neglected as a result of withdrawing the services of the National Guard units from control by the States.

Although we are separated from our enemies by vast expanses of ocean, this precautionary measure was fully justified by subsequent events. Pearl Harbor made it abundantly clear that we might be subjected to attacks by enemy bombers. Even actual invasion is a possibility. Our own raid on Tokyo proved that such things can happen, even across the world's largest body of water.

We entered World War I after the fighting front was fairly well defined and stabilized. There was no threat to the Continental U. S. World War II, however, broke upon us with terrifying suddenness; and it is just that suddenness and surprise which has impressed upon us the wisdom and foresight of authorizing the State Guard, while at the same time bringing to us full realization that it is not being organized and trained to its ultimate potentialities. Are we ready? Do we have enough trained units to meet sudden dangers and emergencies of unusual scope and intensity and take care of any eventuality?

At the conference of Commanding Generals of Service Commands, December, 1942, in New Orleans, La., Major General Grunert, Chief of Administrative Services, ASF, had this to say:

"State Guard organization and training is making slow progress. Much remains to be done in properly equipping and training the Guard. The turnover in personnel adds to the difficulty. A study to determine the overall strength of State Guards which is to be given Federal support and the amount of such support is now under way."

The mere authorization of a State Guard by Congress is not enough. The Guard must be organized and trained sufficiently to carry out its mission. American and Philippine forces were authorized for the defense of the Philippine Islands, but failure to build up the forces resulted in disaster. Organization and training of State Guard forces must not be neglected.

The War Department has, therefore, placed upon the Commanding General, ASF, the responsibility for the formulation of War Department policy and the coordination of all State Guard activities and

training. The National Guard Bureau performs these functions within the ASF.

Under legislation authorizing the State Guards, the type and numbers of State Guard organizations are determined by State authority in light of local situations and conditions; their use is restricted to employment within the boundaries and jurisdiction of their respective States; and they are subject only to State order or control.

However, since the Guard was authorized by amendment to the National Defense Act, and is partly equipped by the War Department, the War Department has defined its mission and assumes the supervision of its training. The National Guard Bureau has prepared suggested training guides for the State Guards, and has established regulations for the supervision of training which now is the responsibility of the Service Commanders. However, since the type and employment of State Guard organizations are to be determined by State authorities, these regulations are necessarily limited to an indication only of the type and course of training to be pursued.

This situation, then, presents to the Service Commander and his staff a challenge to perform a job, not by the simple military process of issuing an order and having it carried out, but by putting imagination and ingenuity to work. It is imperative that interesting and realistic training problems and exercises be developed so as to instill in the various State Adjutants General and their staffs the necessary enthusiasm to bring the training of all their units to the point where the Guard will be prepared to take the field on short notice, and be capable of executing efficiently its security missions.

State Adjutants General should deal directly through the Service Commands and the Chief, National Guard Bureau, in all matters concerning the Guard's mission and employment as well as its training. In order to implement the training program suggested for the Guard, Service Commanders have been directed by General Somervell to extend every assistance possible. This can be accomplished by making available various training aids and by providing suitable part-time instructors.

The military areas and sub-districts of the Service Commands are authorized to lend every assistance in Internal Security, Civilian Defense, and State Guard matters. Training texts may be secured from the Office of the Chief of the National Guard Bureau. The use of training film and film strips is particularly desirable and should be encouraged whenever practicable.

The most effective method of stimulating interest in the Guard, while at the same time giving invaluable training to its members, is the establishment of State Guard Training Schools for State Guard officers and selected noncommissioned officers.

Several Service Commands have already established such schools, and the measure of success of these schools is attested by the size, enthusiasm, and vigor of the Guard in its training activity.

An excellent example of such a school is the State Guard Training School at Fort Leonard Wood, Missouri, in the Seventh Service Command. It has a ten-day course of intensive instruction with the objective of providing a practical training course for officers of the State Guard, and is intended to aid them in developing ability as instructors of their units.

The classes are limited to 150 students, and include officers from several States ranging in rank from General officer to 2d Lieutenant. Some are experienced officers, who had previously served with the National Guard or in the Officers' Reserve Corps—others are novices without any previous military training. Practically every walk of life and talent is represented—lawyers, engineers, professors, business men, salesmen, public officials, and the like.

The curriculum includes subjects believed to be most nearly those which will fit the State Guard mission, and those in which the students will have had the least experience. A considerable number of night exercises are included, as well as demonstration exercises in the day time.

Much of the instruction must necessarily be in the field; therefore, it is practical that there should always be provided at a school of this sort a permanent school detachment of troops for instructional and administrative purposes. Military Police personnel, because their training and employment are somewhat similar to that of State Guards, are ideally suited for a school detachment.

Much stress is placed on such subjects as Riot Duty and Protection of Installations, Demolitions and Obstacles, Grenades, Guerrilla Warfare, Night Operations, Motor Transport, and Company and Squad Tactics.

Adequate training should certainly be emphasized in those weapons which by their characteristics lend themselves admirably to furthering the mission of State Guards. The weapons with which the Guard will be principally concerned are scatter-pattern weapons and chemical munitions. The shotgun is the principal weapon now authorized for the Guard, and its advantages in brush fighting, patrolling from cars or trucks, night operations, street fighting, and in fog, smoke, or rain should be thoroughly explained and illustrated if possible by field exercises.

The use of a shotgun in quelling riots and disorders reduces materially the danger of ricocheting bullets injuring innocent bystanders remote from the scene of the disturbance.

The employment of chemical munitions by State

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Guards in their mission of controlling disorders is their most effective means of routing fifth columnists and quelling riots while at the same time avoiding casualties from bullets. However, to be effective, the chemical must be used in such a manner as to disorganize the concerted action of rioters. It must be used in a heavy and prolonged concentration by men properly trained in its use, or the rioters will merely thin out, allow the wind to blow the gas away, and then re-congregate.

Squad and platoon formations especially designed and developed for use by State Guards in civil disturbances, and action against fifth columnists and parachute attacks should be included as a very vital part of the Guard training program. Imagination and ingenuity on the part of Service Command training personnel in adapting infantry combat formations to specialized State Guard formations will aid materially in bringing the training of the Guard up to its maximum efficiency, and in attracting and maintaining the interest and enthusiasm of Guard Forces in their routine training activities.

Such specialized formations should be designed to carry out specific missions. For example, formations to quell riots and civil disturbances should be designed to become stronger as resistance is encountered and it becomes necessary to concentrate sufficient strength to overcome a sudden attack by the rioters. Skirmish lines in combat formations do not allow this quick concentration in the face of attack.

Other formations must be designed for use in rounding up parachutists or fifth columnists who might be concentrated in defensive positions. Different type formations would be more efficient for retaking vital installations captured by fifth columnists. Training in useful formations should be so extensive and complete that the men and officers concerned operate habitually as a team. The principle, "The strength of the military is the strength

of its military formations and not the individual prowess of its men," cannot be stressed too much.

The Adjutants General are still confronted with the problem of bringing the State Guard up to the strength authorized in the several States. The personnel problem becomes more acute as the manpower shortage in the nation increases.

General Grunert at the New Orleans conference stated further in discussing the State Guard: "The turnover in personnel has been large, but now that the 'teen-age youngsters are being drafted the personnel situation ought to stabilize, although it will be difficult to recruit to authorized organizational strength. Service Commanders might suggest to State Adjutants General that they attempt to secure men over 38 being discharged from the Army."

A good training program for the Guard designed to attract the interest of and instill enthusiasm in its personnel, while at the same time preparing the men for efficient performance of their duties, is a major step in overcoming the perplexing question of recruiting personnel. Men are attracted to an efficient and operating organization.

The importance of State Guard training is very clearly shown by the emphasis which the Command and General Staff School, in its Service Staff Course, is placing on the subject. A total of 7 hours of instruction on State Guard matters is included in the present course, and for the first time a State Guard Training School Handbook is being published. This Handbook contains suggestions on how to set up and get into operation a training school for State Guard officers. An abundance of source material to be used for instructional purposes by instructor personnel is also included.

An adequately trained and organized State Guard, prepared to resist any eventuality within the scope of its mission, is an excellent way to "Remember Pearl Harbor."

Whoever reads history with a mind free from prejudice cannot fail to arrive at a conviction that of all military virtues, energy in the conduct of operations has always contributed the most to the glory and success of arms.

—Carl von Clausewitz.

It's All In the Books

MAJOR JACK W. RUDOLPH, *Infantry*
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In a recent lecture to the faculty of the Command and General Staff School, Lieutenant Colonel L. B. Puller, commander of a marine battalion on Guadalcanal, stated that he had no new or revolutionary theories to offer as a result of his combat experiences. American tactical doctrines and methods proved their correctness under the test of jungle war; the answers are "all in the books" for everyone to read and digest.

Unfortunately, all who read do not digest. Furthermore, to the inexperienced student of war or any other subject, statements of general principles are often so vague that the value of study is hampered by inability to visualize their application to actual conditions. If theory can be studied against a background of example, however, much of the vagueness is dissipated. A good test case is FM 31-20 (*Jungle Warfare*), which has an ideal case history in the recent operations in New Guinea.

The highly spectacular conquest of Guadalcanal attracted more attention than the bitter struggle being waged simultaneously in Papua. Without detracting from the exploits of our men and ships in the Solomon Islands, it is probable that the New Guinea campaign was the most arduous and technically difficult operation ever carried out by American troops. When the history of the campaign is finally written, it will undoubtedly rank as a military epic; meanwhile its lessons are too numerous and too valuable to await its proper Dante.

This is not a chronology of the fighting in New Guinea. It is merely the recital of a series of incidents in the campaign in which the principles of jungle war, as presented in FM 31-20, stand out unmistakably in the light of actual and recent experience. The conclusions to be drawn are self-evident.

Officers and noncommissioned officers must have, and should give their men, a simple knowledge of the fundamentals of military hygiene, preventive medicine, and self-protection (against jungle conditions) if they are to maintain the health of their commands. (Par. 6, Chap. 2).

The hardships of jungle operations demand physical fitness and acclimation of individuals . . . Unless the physical condition of a command is excellent, many casualties will result. (Par. 8, Chap. 2).

The 32d Division had been in Australia some months before its transfer to New

Guinea. It was familiar with Australian conditions, equipped to operate there, and acclimated to the north coast; however, it had never encountered anything like the steaming jungles of Papua. Although some jungle training was hurriedly conducted prior to departure, there was neither time nor terrain in which to do it properly, much less equip and acclimate the men.

Just before leaving Australia, jungle uniforms were improvised by dyeing fatigue clothes a dirty green. Some items of equipment were eliminated, but in general the troops were well loaded down when they reached Port Moresby. There was no opportunity to test this equipment or to accustom troops to equatorial humidity before they were set down in rude jungle clearings across the Owen Stanley range.

The hardships encountered on the march to Buna have been recounted elsewhere in this study. As the going got progressively tougher, men divested themselves of whatever they could throw away to lighten their loads. First to go were blankets, then shelter halves, and finally, mosquito nets. Many men cut their trousers off at the knees—and shortly fell victims to swarms of mosquitos, which caused painfully swollen knees and eventual malaria.

From the start, the troops were always soaked to the skin, either from the stinking ooze of the swamps through which they waded, torrential rains, or their own perspiration—frequently a combination of all three. There were no changes of clothing; some men went for days without a chance to remove their sodden footwear. When they did, their feet were shrunken and blue.

The first elements of the division arrived before Buna with practically nothing but the disintegrating clothing they had worn for weeks. Many were virtually in rags. They had neither blankets, shelter halves, nor mosquito screens to ward off insects and rain. When landing strips were hacked out of the jungle, the first planes to arrive had to carry almost complete reequipment.

These troops suffered great hardships—many inevitable, but others because of their own ignorance—and after the march they fought magnificently. But in two months some units lost up to sixty-five percent of their effectives. For every one hit by a Jap bullet, two were knocked out by malaria, dysentery, dengue fever, skin infection, heat exhaustion, and other afflictions that lurk in the jungle.

Clothing selected for jungle service should have a minimum capacity for heat absorption and a maximum capacity for the circulation of air to permit the evaporation of moisture (perspiration) from the body. (Par. 17, Chap. 2).

Lacking suitable clothing for extended jungle service, the troops improvised uniforms by dyeing their fatigues. These had the advantage of looseness, thus permitting air circulation, but they were heavy and did not absorb perspiration readily. They also tore easily and were hard to mend. Under continuous wetting, the uniforms disintegrated rapidly.

Several interesting changes came out of the experiment however. Both Australian and American troops are to be issued a shirt, similar to the fatigue jacket, which does not require tucking the skirt into the trousers, while the Australians have adopted the American leggings. In turn we have replaced the shelter half with the ground sheet—a poncho-like affair which is lighter than the shelter half and renders better protection from the wet.

It is also reported that a light, canvas topped shoe is being issued to replace the heavy field shoe, which failed to hold up under jungle conditions.

Do not fear the jungle. A man can travel alone for weeks in uninhabited country if he keeps relaxed and uses his head. (Par. 24n, Chap. 3).

Returning from a bombing mission, Capt. John D. Felthman lost his way, ran out of gas, and crash landed in a jungle clearing. He and his crew, 1st Lt. Hugh Turk and Sgt. O. N. Ferguson, spent a fruitless week trying to repair their damaged plane, then set out on foot through the wilderness.

Several weeks of aimless wandering, during which they subsisted on what they could find, brought them to an abandoned airfield where they found two old planes and a cache of gas. One of them, a 1915 vintage trainer, was patched up by the resourceful trio with parts from the other derelict. Capt. Felthman actually got the ship into the air, but stalled and crashed in the jungle.

His companions found him unconscious in the wreckage after a five-hour search and carried him back to camp on an improvised litter. A few days later they were discovered and rescued by an Australian pilot. The three men returned to their base, none the worse for their ex-

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perience, after two months in the jungle.

Theirs was only one of several score cases of flyers forced down, who came through the wilderness unhurt. The classic example, of course, is the case of Verne Haugland, the war correspondent, who was rescued after six weeks of wandering. Haugland nearly starved, but he kept his wits until fever drove him delirious. Through it all he kept a diary that made him famous.

Proper food is necessary, but the quantity of food required is not so great as is commonly supposed. (Par. 20, Chap. 3).

Rations will necessarily consist of non-perishable items . . . Field ration C fully meets this requirement. (Par. 84, Chap. 13).

In the advance on Buna, American troops subsisted for weeks on one-third rations while they marched 120 miles over rugged hills, tangled jungle, and waist deep swamps. During this march, at the conclusion of which they went into action against the intricate Buna defenses, the men lived exclusively on the C ration. Due to supply difficulties they were limited, however, to two cans a day instead of the regulation six.

E. R. Noderer, correspondent for the *Chicago Tribune*, who participated in the advance, reported that the ration, which consisted of one can of meat and beans or vegetables plus the light can of candy, powdered coffee, sugar, and hard tack, was wholesome and good. Noderer fared better than most. He had four cans a day, and in one month lost twenty pounds.

Australian rations during the siege of Buna consisted almost entirely of tinned bully beef, army biscuits, and curried rice. Occasionally the beef was cooked into a tepid stew, but usually it was eaten cold from the can.

The rice was an afterthought resulting from experience gained during the pursuit over the Owen Stanley Mountains to Kokoda. Abandoned Japanese rice stores were seized and cooked with the light rations carried by the troops. It proved so nutritious that it has since become a standard part of the Australian jungle ration.

In preparing for operations in jungle regions, a careful study of terrain conditions will aid the commander materially in determining suitable armament for the forces involved. (Par. 28, Chap. 4).

The primary weapons, that is, those which meet most completely the above conditions (i. e., of jungle combat) are the rifle, automatic rifle, pistol, submachine gun, bayonet, hand grenade, and machete. (Par. 26, Chap. 4).

Secondary weapons are the light machine gun and 60-mm mortar. (Par. 28, Chap. 4).

Because of the rugged terrain, both in the Owen Stanley Mountains and around Buna-Gona, armor and artillery enjoyed only limited use. The Japanese hauled a couple of light 37-mm antitank guns up the Kokoda trail, but never got any efficient use from them and finally abandoned them in the retreat.

Trail conditions prevented the Allies from moving anything overland, except what they could carry. Only when landing strips had been constructed were field guns brought in, and once in position these weapons could not be moved.

Throughout the campaign the principal weapons were rifles, grenades, light machine guns, and mortars. Japanese bunkers were stormed with the bayonet and their defenders routed or killed by submachine-gun fire, hand grenades, or in hand-to-hand combat.

Allied officers later testified that it was frequently difficult to persuade men to use their heavier weapons. The American carbine, however, proved to be an ideal jungle weapon. According to reports some infantry units are to be equipped with carbines in place of the heavier rifles.

Jungle fighting is performed largely by infantry. Combat is usually characterized by close fighting. Support of infantry by other arms will frequently be impracticable or impossible. (Par. 30, Chap. 5).

Except for the later stages of the fighting around Buna-Gona, when tanks, artillery, and air power were coordinated into the annihilation campaign, ground action was exclusively an infantry fight. Even in the final assault, infantry carried the network of Japanese pill boxes and fought it out hand-to-hand with rifles, grenades, tommy guns, and bayonets. Observed artillery fire and long-range mortar work was impossible, except at open sight distances.

The fighting was all close combat, being waged at ranges rarely exceeding one hundred yards and usually opening within twenty-five yards. Command posts were so close to the lines that officers working in them frequently shot Jap snipers with submachine guns. Three American generals were wounded by rifle and grenade fire during the siege while directing their troops at close quarters.

Combat aviation may be employed as a substitute for artillery and for infantry . . . mortars in operations in dense jungle. (Par. 29, Chap. 4).

Medium and light bombardment furnishes jungle columns their best substitute for artillery support. (Par. 37c, Chap. 5).

Aviation served four vital roles in the New Guinea campaign: (1) It transported

troops to the combat zone, (2) maintained a smoothly flowing stream of supplies right up to the front, (3) acted as a navy, and (4) gave close support to ground troops by bombing and strafing enemy installations. Its successful use was probably the greatest test of flexibility ever met by an air force.

Throughout the Buna battle, infantry attacks were paced by low-flying fighters and light bombers striking at positions which mortars and artillery were unable to reach by observed fire. Perhaps the outstanding example of this support was the air phase of the attack on Cape Endaiadere described elsewhere in this study. Medium and heavy bombers struck at supply depots from Lae to Buna.

Mechanized units will have little or no combat value in the jungle itself. They can be effectively employed on sábanas or other open areas and against native villages. (Par. 35, Chap. 5).

Early in December Australian light tanks were moved into the area before Cape Endaiadere and spearheaded the attack that crushed this strong point. Their use was possible because the cape had once been a coconut plantation and was covered with evenly spaced coco palms instead of the usual jungle undergrowth.

The cape area was also slightly higher than the surrounding land and provided the tanks with firm ground over which to move. A few tanks were also used in mopping up Buna but otherwise could not function because of the swampy country and tangled jungle. The network of tidal streams around the final Jap stronghold at Cape Sanananda prevented their use, forcing the infantry to clean it up without armored assistance.

At Milne Bay the Japanese landed a company of tanks to assist in the attack on the Allied air base under construction there. The tanks came ashore all right and moved over the beach, but once inland bogged down in the treacherous soft ground and were destroyed or abandoned. The Milne Bay fight was the only one in New Guinea in which the Nipponese attempted to use tanks.

Engineers should be attached to every jungle expedition. Their chief uses will be bridging . . . trail improvement and maintenance, water purification, and the siting of small, interlocking defensive works. (Par. 34, Chap. 5).

The first troops to be flown into the Buna area after the arrival of the infantry were aviation engineers. They quickly cleared and levelled the landing strips which were necessary to bring in supplies. Roads were built and maintained—a continuous headache during the tropical rainy season, supply dumps were

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set up, water plants installed, and bridges built over jungle rivers.

At the front engineers were used in bridging operations, suffering many casualties as they repaired water crossings under fire. The completeness of the Japanese defensive works also indicates that their construction was the work of engineer specialists.

During the Japanese advance on Port Moresby, a serious bottleneck existed in the "Wairopi" Bridge across the Kumusi River. This bridge was suspended on cables across a precipitous canyon and was extremely susceptible to aerial bombing.

The Allies bombed and strafed the bridge regularly. It was badly damaged on numerous occasions and rendered temporarily unfit for use, but never completely destroyed. Japanese engineer troops, using materials stored at either end of the span, promptly restored it to service after each attack. The Japs wrecked the bridge in their retreat, but Australian engineers quickly rebuilt it in their turn.

A commander of any expedition into a tropical country should, at once, take steps to avail himself of the assistance of natives of that area as guides, cargadores, scouts, and native auxiliaries. (Par. 39, Chap. 6).

Sgt. Katue, one time head hunter and native policeman, was left in his home village when the Japanese landed at Gona in July. Katue, who was suffering from leg rheumatism, hid in the jungle until he had recovered, then recruited a small band of native boys to harass the invaders. For seventy-three days Katue's "army" of fourteen raiders roamed behind the Japanese lines, ambushing small parties, burning supply dumps, and terrorizing the country.

When their ammunition ran out the band made their way back to the Allied lines for more cartridges, then returned to their hunting ground. During this time, Katue personally accounted for twenty-six Japs.

Native carriers constituted the backbone of the ground supply trains for both forces during the campaign. Natives hauled most of the supplies needed by the Australians in their pursuit along the Kokoda trace. Having carried supplies to the front, these cargadores manned litters to bring out the wounded. Most of them employed before Buna were transported to the area by plane. They worked loyally and hard, suffered casualties, and contributed heavily to the success of the operation.

The Japanese had little luck rounding up Papuan natives for carrier work but imported coolies from Korea and New

Britain. The coolies displayed a tendency to drop their packs and disappear into the jungle under mortar or aerial attack, but being in a strange country, they eventually returned. However, many deserted and escaped to the Allied lines.

The rate of march is greatly dependent on the condition of the trail. (Par. 46, Chap. 7).

As troops continue to pass over the trail some parts become deep with mud. (Par. 48, Chap. 7).

Even under most optimistic conditions, distances on the Kokoda trace were habitually measured in time rather than miles. The accepted unit of measure was the time required between two points by a man carrying a light pack over a dry trail.

Passing through Kokoda gap the trail crossed a series of knife-like ridges, rising and falling between 2,000 and 5,000 feet in a few miles. As the Australians advanced they were traversing a rain soaked path already cut up by two months of fighting and marching. In some places the path was so steep that steps had been cut into the hillsides—1,400 slippery, clay steps led down into one valley. Sometimes the trail was so precipitous that both hands were needed to negotiate it. Men lashed packs to their backs and pulled themselves up by roots and vines growing beside the trace.

Troops loaded with forty-pound packs, weapons, and ammunition moved through ankle deep mud holes, pulled themselves along on hands and knees, and maintained constant watch for ever present dangers of ambush. In twenty-five days, meeting virtually no resistance, the Australians covered twenty-five miles.

The following description of the Buna trail was written by a correspondent who passed over it:

"Take a midwestern hog wallow after a hard rain. Drive a herd of cows through it. Wind vines and roots just out of sight. Then march a couple of hundred soldiers through it and it should approximate the Buna trail.

"If there is a little creek handy flood it over the area until the water in places is waist deep, and you will also have a replica of the Buna trail at an unusual stage."

To quote correspondent George Weller:

"Except for patches of green kunai grass, you are constantly in the darkest jungle. The track is merely a ribbon of oozing mud varying from ankle to knee depth. At the first step your heavy army boots, surmounted by leggings, come sucking forth with a protesting gulp. Your body literally streams sweat. Sweat seeps stingingly into your eyes. And at every step it gets more difficult to lift your boots."

Enveloping action by small units is more time-consuming, but equally, if not more, effective in jungle than in more open terrain. (Par. 68c, Chap. 10).

A neatly executed envelopment temporarily halted the Japanese at Kokoda in August, retaking the village and inflicting heavy casualties.

The action opened with a six-hour attack that drove the Japs back about a thousand yards. Feigning retreat the Australians then withdrew and lured the Japanese defending Kokoda into a quick pursuit. Meanwhile, however, the main force had angled through the jungle to the rear of the Japanese and recaptured the town without firing a shot.

While Allied planes patrolled the trail below Kokoda to prevent the dispatch of reinforcements, these two units closed in on the surrounded Japanese and routed them with heavy losses. The balance escaped through the bush.

American Aircobras, fitted with bomb racks, participated in the action; the first time pursuit ships were converted into bombers during the campaign.

The success of an attack will often depend on a rapid and determined execution of a pre-arranged plan of action. (Par. 68b, Chap. 10).

On December 18th a coordinated attack by planes, tanks, and infantry crushed a strong Japanese defensive position on Cape Endaiadere. This attack, carried out after careful preparations, achieved complete success in less than five hours against a strong point which had repulsed all assaults for nearly a month.

The assault force consisted of Australian armored troops equipped with light General Stuart tanks and followed by Australian infantry, Middle East veterans trained to operate with armored troops. This force was brought up quietly a few days before the attack and hidden in the jungle on the extreme right flank of the Allied position.

During the night of Dec. 17-18, the American infantry holding the line, pulled back a short distance to permit the planned artillery preparation. The withdrawal was not detected, and just before dawn an intense artillery and mortar barrage came down on the Japanese defenses. This concentration, the most intense yet produced on the Buna front, lasted ten minutes.

At 0700 the barrage lifted and a wave of light bombers and fighter planes subjected the Japs to a distracting bombardment and strafing from the air. Under cover of the air attack, the tanks moved forward, closely followed by the infantry.

The assault caught the Japs completely by surprise and within an hour had broken through to the beach for a gain of a thousand yards. The attack then faced at right angles from its initial di-

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rection and struck into the heart of the Japanese position along the newly created thousand-yard front. By noon resistance on Cape Endiaderere had been shattered and the Allied line pushed along the beach for several hundred yards beyond it.

Jungle combat demands the maximum in initiative and acceptance of responsibility. (Par. 67d, Chap. 10).

Since combat in the jungle will normally develop into numerous small, independent actions, the initiative and troop leading ability of lower commanders are of major importance. (Par. 70a (2), Chap. 10).

During the first week of December, while American forces were inching forward against strong defensive positions around Buna, Sgt. Herman Bottcher of San Francisco led a squad of twelve men toward the beach against heavy machine-gun cross fire. After several hours of close fighting the party reached the beach between Buna village and the nearby mission. Disposing themselves in depth, Bottcher's men held a narrow wedge through the heart of the position, preventing the Japanese from shifting men and supplies between the two strong points.

Bottcher repeatedly led his squad in wiping out machine gun and sniper nests. At the height of the battle he returned alone to the American lines for water for his wounded. At least two attacks, launched from two sides, were made on his position and repulsed with heavy losses. Captured Jap machine guns figured prominently in the defense.

Later, Sgt. Bottcher went out alone and silenced a particularly dangerous machine-gun emplacement with grenades. That same night his alertness foiled an attempt to move around his tiny beachhead by water.

The battling sergeant was lightly wounded several times but remained with his squad until reinforcements widened the breach he had made. His action was instrumental in splitting the Japanese position at Buna, leading to its eventual reduction. For his outstanding leadership and heroism, Sgt. Bottcher was awarded the D.S.C. and commissioned a captain.

Small groups . . . may be sent into the enemy rear area to destroy communications and supply installations and to ambush small parties and supply convoys. Individuals selected for such duty must possess great physical endurance and be capable of thinking and acting quickly. (Par. 70b (1), Chap. 10).

Harassing detachments are suitably employed to cut the enemy's lines of communication, destroy his rear installations, prevent the supply of leading units, and attack the flanks and rear of enemy forces. (Par. 74b, Chap. 10).

When the Japanese landed strong forces at Buna and Gona after previous landings in Lae and Salamaua, a force of Australian commandos was left in the vicinity of Wau, a gold town between the two beachheads. During the subsequent campaign this force, completely cut off from support, carried out a series of destructive raids in the Salamaua area and held an important airfield which later assumed vital significance.

On at least three occasions this force advanced secretly on Salamaua and carried out successful attacks against the Japanese base. One typical attack, launched at night after an undiscovered jungle march, penetrated to the heart of the village, causing intense confusion, considerable damage to stores and installations, and heavy casualties. More than a hundred Japs were killed, dumps were rifled and then burned, after which the raiders withdrew without the loss of a man.

During months of guerrilla warfare, the commandos were without supplies, except what they had stored in preparation for the campaign, what they could procure locally, and what they took from the Japanese. Following the fall of Buna this force repulsed a column advancing from Salamaua and held a base from which the victorious Allies were later able to conduct operations directly against the Lae-Salamaua area.

A defensive position should be so located as to intercept the hostile force, or offer such a threat to hostile advance as to require its reduction before the advance is continued . . . Secure flanks are of supreme importance. (Par. 71, Chap. 10).

The organization of a closely knit defensive area is fundamental in jungle defense. This defensive organization should prevent the unopposed penetration of small hostile forces and the attack of defense areas in flank and rear. (Par. 72, Chap. 10).

The defenses of the Buna-Gona beachhead consisted of a maze of intricate and cunningly built strong points, sited for mutual support and extending in depth all the way back to the beach. The Japanese had constructed hundreds of bunkers, linking them together with covered communication trenches and enfilading fire lanes.

Every terrain feature was utilized in their organization. Groups of bunkers were sited for all-around defense and laid out within supporting distance of similar strong points. Flanks were secured on impassable morasses, rivers, and the sea itself. Sniper posts infested the overhanging trees, from which attackers who penetrated final protective lines could be picked off on the approaches to the pill boxes.

Virtually every fortification had an al-

ternate position to which its defenders could shift via covered routes when Allied fire became too heavy and accurate. Lanes of fire, criss-crossing in every direction before, between, and behind these nests, were cleared only enough for observation and were thus difficult to locate and avoid.

The bunkers were sturdily constructed and beautifully camouflaged. Mortar fire was relatively ineffective against them, and some even stood up under direct hits from 105-mm howitzers and 25 pounders.

The typical bunker was a squad pill box about five feet high, covered with logs and earth, and camouflaged by underbrush or fallen palm fronds. A pit about eighteen inches deep was surrounded by walls of logs and earth-filled ammunition cases or oil drums. Over the pit, which usually had a clearance of about five feet, layers of logs were piled and covered with earth. Embrasures slightly above ground level were left open from which machine guns swept their assigned sectors.

Another type of nest found in occupied native villages was a blockhouse built beneath native huts. The hut stilts were used to support the overhead strengthening which consisted of logs piled on the floor of the house. Beneath the hut, log and earth revettments were built up to within a short distance of the floor, the open space being left to provide firing points. Within these blockhouses the garrison could move about freely and live comfortably on stocked up supplies.

Bolstered by a garrison determined to resist to the death, the Papuan beachhead presented a powerful bastion whose destruction definitely killed the fallacy that Japanese soldiers were not skilled in defensive tactics.

In dense jungle areas delaying action will be executed principally on and near trails. (Par. 77a, Chap. 11).

A battalion of Australian infantry, acting as advance guard for the main column advancing toward Kokoda, was stopped by a Japanese unit dug in across the trail. While the leading company attacked frontally, a second company was sent to the right in an effort to outflank the position, only to be stopped by heavy fire as it approached its objective.

The third company, working around the other flank encountered similar resistance, whereupon the last company was ordered to bypass the position and attack from the rear. Again the Japs foiled the attempt. Although surrounded, the Japanese were firmly planted across the trail, effectively denying passage.

The Australian commander decided to cut his way around the resistance and leave it to be cleaned out later. He reconstituted his advance guard, leaving the original battalion to reduce the strong point, and moved on. His decision pre-

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vented a serious delay, but did impose extra and arduous marching on his column.

Next morning the battalion surrounding the Japanese attacked from all sides and wiped out the position. When the battle ended, two hundred dead Japs were counted. In this case, prompt action prevented what might have been a long delay for the Australian column, but the resistance forced the diversion of an entire battalion to clean out a single company.

Denying the enemy the use of roads, trails, and other avenues of approach, and harrying his lines of communication as he seeks to advance, may so harass, discourage, and exhaust his troops as to decrease materially their effectiveness and permit a decisive counterblow by friendly forces. (Par. 75, Chap. 11).

During the Australian retreat across Papua, both forces were completely dependent upon the difficult Kokoda trace for a supply line. As the Japanese advanced they encountered increasing difficulties in moving stores over this narrow, unimproved jungle trail. The condition of the track through Kokoda Gap, particularly after the Australians had retreated over it, was extremely bad.

Having achieved air advantage over the battle area, the Allied air force concentrated on this tenuous supply route. For hours every day low-flying fighters and bombers ranged up and down the trail, bombing and strafing it continuously.

Located supply dumps and bivouacs were attacked, columns on the trail were machine gunned and driven into the bordering jungle, and every village or clearing likely to harbor a military installation was hit repeatedly. The famous "Wairopi bridge" spanning the Kumusi river received particular attention, and although Japanese engineers performed prodigies of repair work, it became a bottleneck which seriously hampered an already weakened supply system.

Under incessant aerial pounding the Japanese advance stalled only thirty-two miles from Port Moresby after covering the most difficult part of the country. When the Australians counterattacked several days later they encountered little or no resistance. The condition of the trail, abandoned equipment, and Japanese dead discovered along the trace were mute but eloquent evidence of the effectiveness of uninterrupted harassing from the air. By making it virtually impossible for the Japanese to use the trace, the air forces broke the back of the in-

vasion and set the stage for their rapid retreat.

Cover and concealment provided by the jungle permit easy withdrawal by units in contact with the enemy. (Par. 76, Chap. 11).

When the Japanese abandoned their advance positions at Iroibaiwa, 32 miles from Port Moresby, they retired down the Kokoda trace nearly a hundred miles to Buna without enabling the Australians to reestablish contact except where the retreating forces elected to make a stand. The retirement from Iroibaiwa was accomplished without the Allies detecting it.

The night before the battle for Cape Endaiadere, American infantry holding positions sometimes within twenty-five yards of the Japanese lines, withdrew from contact. The Japanese never detected the withdrawal and were completely surprised by the artillery barrage that struck them at dawn.

Assault troops must depend on the bayonet, grenade, and machete. (Par. 78d, Chap. 12).

The reduction of the beachhead around Buna and Gona was only accomplished after weeks of deadly, close combat with hand weapons carrying the burden. Some artillery and tanks were employed, but their use was restricted and confined to the task of assisting the infantry forward.

Every strong point and bunker was defended tenaciously, and was only taken after its garrison had been wiped out by grenade and tommy gun fire or bayoneted in hand-to-hand fighting. Rifle marksmanship was at a premium and demonstrated its effect so frequently that incidents were countless.

To quote one Allied commander, the fighting around Buna was the nearest thing to the type of fighting that conquered the Atlantic coastal areas, Kentucky, and Florida from the Indians. One general said that it was like fighting inside a mattress.

Air transportation . . . may be used to excellent advantage when there are open clearings of sufficient extent to permit the dropping of supplies by parachute or the landing of supply planes. (Par. 83c, Chap. 13).

Without the remarkable ferry service provided by Gen. Kenny's air force, the New Guinea campaign could never have been fought. Except for the zone within a few hundred yards of the front

line, the entire supply of the campaign was an air operation, involving the transportation of troops, munitions, food, artillery, tractors, jeeps, and everything else required to keep an army functioning.

The movement of troops from Australia was done almost entirely by air, the first mass movement by air in American military history. Elements of the 32d Division were carried over the mountains to a point midway between Milne Bay and Buna, from whence they began their overland advance. From then on these troops were fed by air, rations being dropped at intervals along the route.

With the Japs bottled up in Buna, air strips were hacked out of the jungle, and heavy equipment flown in to within hundreds of yards of the front. When mortars and machine guns failed to reduce the defenses, 105-mm howitzers and Australian 25 pounders were brought up. Other items ferried in were tractors, jeeps, surgical hospitals, and munitions. At times, pilots of these transports flew directly over the Jap position, crossing them as low as 100 feet to come in for landings.

Where strips were not available, supplies were dropped by parachute. Frequently, bundles were carefully wrapped and simply thrown over the side. Toward the end of the siege the Japs began supplying their hard pressed troops by parachute, in one day dropping more than 130 bundles into the Buna area.

Pilots, some of them civilians, took desperate chances to deliver their cargoes. Standard technique was to cross the mountains through Kokoda Gap, then hedgehop to the destination, trusting to camouflage—the ships were painted green to blend with the jungle—and low altitude to elude Japanese Zeroes. Landings were made on air strips that even the most daredevil barnstormer once would have avoided. In the entire operation, only five planes were lost, two being shot down, two destroyed on the ground, and one lost in bad weather.

The above examples constitute only a fraction of the total evidence available to substantiate the correctness of FM 31-20. This manual is but one of many books written to teach principles and methods of modern war. The reading will not, of course, take the place of actual experience, but being based on experience can be valuable in enabling our soldiers better to fit themselves for combat. It's all there in the books—don't neglect them.

Never Say "I"

COLONEL GLENN H. PALMER, *Signal Corps*
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Directive of the Commandant to Instructors at the Command and General Staff School: "Never say 'I' when speaking of your actions as a general staff officer."

There are no individuals in a staff. Each staff officer is simply one fibre in the rein through which the commander controls his unit. Each fibre by itself is of little value, but all working together make the commander's control effective.

The duties of the staff are so organized that every matter—every decision, every piece of information—concerns at least two staff officers and frequently many more. The product of staff work cannot, therefore, result from the labors of only one individual.

It may appear that such duality of responsibility or interest would lead to duplication of effort and undesirable delays. If this were really duplication, delay would be the inevitable result. In a properly operating staff, however, it is not duplication, but simply insurance that all factors are taken into account and are coordinated.

Consider the assignment of replacements. G-1, by consultation with G-3, determines the priority of requirements of the several units, and makes allotments accordingly. Working under the priorities and allotments set up by the general staff officers, the Adjutant General makes the actual assignments. If two units have need for men of the same qualifications, the decision as to which unit gets a particular soldier is made by the Adjutant General, whose decision is guided by the priorities prescribed by G-1 in the name of the commander. The Adjutant General deals in individuals, while G-1 deals in general classifications and needs.

When a division establishes distributing points for supplies, G-4 does not designate the location of each. Rather he may indicate to the special staff officers representing the several supply services certain areas where they may or may not locate their activities. Each special staff officer then makes the necessary reconnaissance to select the locations of his particular activities. Any conflict or duplication is eliminated by conference between the special staff officers concerned, or by consultation with G-4.

When a field order is prepared for an attack, G-3 does not designate particular locations for artillery battalions or batteries. He indicates to the special staff the line of departure, the objective, main effort, boundaries between infantry units, and the time of the attack. Each special staff officer then prepares a plan for the particular activity or service with which he is concerned, in support of the general plan which

was outlined by G-3. The Artillery Officer prepares a scheme for artillery fires to support the attack, with appropriate emphasis on the main effort of the division. But even the Artillery Officer himself may not indicate particular areas for battalions. Instead, he specifies the areas on which units must be able to fire, and general position areas. Coordination between different artillery battalions is obtained by specifying boundaries and by reserving areas for units for which the selection may be limited by reason of target areas or weapon characteristics. So much of the Artillery Officer's plan as must be known to all units for effective coordination of their fires and positions is then given to G-3 for inclusion in the field order.

G-2 may be the first staff officer at the division command post to receive information that the enemy is using a new type of gas. G-2 then disseminates the information to all troops as a warning, and to the Chemical Officer as information to guide him in his duties. G-2 does not direct the Chemical Officer to investigate and report on the gas, since the Chemical Officer, like every staff officer, is presumed to know his own job. The collection and evaluation of information concerning the utilization of chemicals by the enemy is a specific duty of the Chemical Officer, and he will perform that duty without any specific directive. G-2's duty in this connection is to disseminate to interested commanders, and to other staff officers, information which is of importance to them, so that each may properly direct his own activities in the light of that information.

It should appear from the foregoing that the duties of the general staff are to harmonize the plans, duties, and operations of the several special staff officers; to elaborate and pass on the commander's instructions in sufficient detail to insure coordinated operations of subordinate units, but not to such degree as to limit unduly the initiative of special staff officers and subordinate commanders; and to supervise the execution of those instructions, reporting on that execution to the commander whom the staff officer serves.

Much confusion arises from the fact that many special staff officers are also commanders of the units whose activities they plan and supervise. Only the staff duties are under discussion here, and they are quite distinct from the duties of the same individuals as commanders. It is sometimes said that the special staff operates, while the general staff coordinates. It would be better to say that it is the commander who operates, while every staff officer coordinates. The distinction between staff officers is rather that the special staff officer concerns himself with a par-

ticular unit or service, while the general staff officer is concerned with a particular function in all units and services.

In the words of the Staff Officers' Field Manual, "Teamwork is essential within and between staffs . . . It is assured by cooperation and collaboration within and between all sections of the general and special staff groups . . . Prompt dissemination of

essential information and of decisions and orders within and between groups is vital to the efficient functioning of a command."

The staff officer must always think and act in terms of "We" within the staff. To the outside world he has no identity separate from that of his commander.

There can be no "I" in staff work.

Infantry Fire in Offense and Defense

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article in *Krasnaya Zvezda* 30 October 1942.]

The company commanded by Lieutenant Sviridov was to occupy a certain hill, but the Germans succeeded in reaching this hill ahead of our troops. Seeing this, the lieutenant accelerated the advance in order to prevent the enemy from consolidating his position. While advancing towards the hill, the men were conducting individual rifle fire which apparently had little effect on the enemy who continued energetic machine-gun fire, thus preventing the company from reaching the hill.

The company commander observed this, but he had nothing with which to strengthen his fire, for the machine guns and mortars had been withdrawn earlier to execute another mission of the battalion. Then this thought flashed in the commander's mind: salvo fire should be employed. He did this and results were quick in manifesting themselves. Under the salvos of rifle fire, which were fired in succession, the German fire began to weaken gradually. The company conducted salvo fire not all at once but by platoons in their proper order. The first platoon fired, the second prepared to fire, and the third platoon advanced forward at this precise moment. Next the second platoon fired, the third platoon stopped and prepared to fire a salvo, while the first platoon advanced quickly forward. The commander led the company with skill, and its fire and forward advance appeared to be well organized.

In this manner the company approached the enemy to a point from which an attack could be undertaken. The salvo fire pinned the Germans down and inflicted heavy losses. Seeing that our company was coming ever closer and lacking the strength to stop it, the enemy was compelled to begin retreating. By a decisive attack our troops drove the remnants of the enemy from the hill.

Here is another example showing the serious effect that salvo fire has on the enemy. Numerically superior German forces undertook offensive action against one of our guard units. Estimating this

situation, the Soviet commander decided to paralyze the German action by launching a sudden counterattack against the enemy flank. For this task a battalion commanded by Lieutenant of the Guards Alekseyenko was designated. After going around the enemy through a forest, the battalion emerged on the German left flank.

At this time the observers reported to the battalion commander that a German column was seen moving in the village on the right. This placed the battalion in a difficult situation. While attacking the Germans on the left the battalion was exposed to an enemy blow from the right. The battalion commander's decision was: *while continuing his primary mission with two companies, to attack the Germans with one company when their column would be leaving the village.* Because the Germans were moving in compact masses it was pointed out to the company commanders that employment of salvo fire was advisable.

The calculation as to the suddenness and power of our fire was proved to be correct. As soon as the German column emerged from the village it suddenly encountered rifle salvos. The enemy immediately lost about 50 percent of his personnel. The salvos which followed forced the surviving Germans to disperse and seek cover in the forest. Having dealt the enemy a blow on the right, the company immediately rejoined the battalion, thus strengthening the power of its fire.

The left flank of the main German column also found itself under our rifle salvos which followed closely, one after another. The salvos made a deep impression on the Germans, moreover, because the battalion was simultaneously employing massed machine-gun and mortar fire. The ranks of the advancing fascists were thrown into disorder. They became confused. The commander of our unit who was at the OP noticed this. Estimating this favorable situation he undertook a de-

cisive frontal counterattack. At the same time the battalion of Lieutenant of the Guards Alekseyenko threw itself upon the enemy. The enemy was forced to run, leaving many killed and wounded as well as a large quantity of weapons and ammunition. The sudden employment of salvo fire against the enemy flank played an important part in this engagement.

At the present time this guard unit in certain cases employs salvo fire which brings good results. The unit employs salvo fire in all forms of combat, firing in this manner mainly against closely packed masses of enemy personnel. Also, salvo fire is employed on the march when sudden enemy attacks have to be beaten back.

The method of salvo fire is an irreplaceable method for strengthening of fire discipline in the squad, platoon, and company if the command organizes it skillfully. It is absolutely necessary that the fire should be simultaneous by the entire personnel, second by second. A belated or premature shot by one or more men lowers the fire power and its effect on the enemy.

When the target is wide it is not permissible for all the squads and platoons to fire against the same point. The fire should be equally distributed on the entire target. The commander must point out to his men where they must aim. The men on the right flank must aim their rifles at the right side of the target, and the men on the left flank at the left side. When it is necessary to create cross salvo fire this method is reversed.

This article shows the advantages of salvo rifle fire. This, of course, does not mean that this method must replace individual rifle fire. Individual fire continues to preserve its effectiveness. During the course of the battles each rifleman must continue to master his weapon and, particularly, to be able to find targets unassisted and hit them with his rifle fire.

Notes on Winter Warfare in the Mountains

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Warfare in mountains covered with snow differs from other types of warfare in that movement off the road is difficult and also that the cold weather is an enemy that kills the weak, the untrained, and the exhausted man just as surely as any human enemy.

The roles of mountain divisions may be summarized as:

- a. To seize and hold ground.
- b. To carry out a diversionary attack.
- c. To raid into enemy country.
- d. To guard possible avenues of enemy approach.
- e. To secure the head and flanks of a normal force passing through mountains.
- f. To reconnoiter in the mountains.

Such roles necessitate a high physical endurance on the part of the individual and ability to use the mountains as allies rather than as enemies.

With well selected personnel it is not difficult to harden men sufficiently to stand the rigours of the climate. What is far more difficult is to train the men to have a "mountain sense." For this reason the personnel of mountain divisions should be chosen if possible from men who live in the mountains or who are mountaineers. Few skiers in peace time are mountaineers. The man who has spent his holidays going up on a ski tow and racing down on snow, hard packed by a thousand similar holiday makers, is seldom a mountaineer, one who understands snow conditions, or who can move quickly and safely in high mountains. The climber, on the other hand, generally does understand mountain conditions.

It is essential to have as large a leaven as possible of men in a mountain division who have "mountain sense." They will teach the others, but the only good school is that of hard experience.

Roads, paths, and trails in snow covered country are invisible. The deeper the snow, the more difficult it is to move. Artificial aids such as the ski and the snowshoe are necessary for the individual to move at all off a path. To pull a sled or a toboggan, the snow has to be hard packed into a path or trail. No snow vehicle has yet been produced that can move across deep untrodden snow uphill. A path must be first packed by the passage of skiers or snowshoers. The trail packed by snowshoers moving two abreast is sufficient for the passage of snow vehicles of the track type, as long as the actual trail is horizontal. In moving across the face of a hill on a traverse, if the hill is at all steep, neither snowshoers nor skiers

will produce a practical trail for vehicles. The trail slopes away down hill, and the snow vehicle will slide sideways and be hard to recover.

Skiers, on the other hand, will not produce a trail practical for vehicles at all in deep snow, unless their number be very great. This fact is important and should not be forgotten in deciding the proportion of skiers and snowshoers in mountain units. A man can be trained to move freely in deep snow on snow shoes in a week. It takes months to produce a skier who can move equally freely. Snowshoes are much easier to manage than skis through brushwood and forests. They are lighter and cheaper than skis, and their care is easier. Their great disadvantage is that the snowshoe is slower downhill. Snow conditions affect the pace of the skier enormously, but the snowshoer hardly at all.

Another factor—if sleds or toboggans are to be pulled, and as will be discussed later this is most necessary, the snowshoer is the man. The skier even with climbers (or skins) on his skis is a poor draught animal, and the passage of his skis over the snow does not produce a trail for the toboggan to ride on. The snowshoer, on the other hand, does automatically produce such a trail. The snowshoer can lie down and shoot in an instant, and be up and away again—not so the skier.

The case for the snowshoer is a strong one, but the need for speed necessitates the use of the skier as well. In infantry battalions, the proportion of snowshoers to skiers should be 2 to 1. All officers should be able to ski. The artillery will be all on snowshoes except the signallers and forward observers who should be on skis. All artillery officers should be capable of skiing if possible. In the engineers and the other services, only reconnaissance personnel, and that includes all officers, will need to ski. The commanders of all units and their staffs must be capable skiers.

It is useless to take a normal division and put the men on skis or snowshoes and expect it to function. A mountain division must be based on the special needs of the mountains. For the infantry the special need is for the patrol, which should not exceed 6 men. On this basis should the platoon, company, and battalion be based. Whether the proportion of snowshoers to skiers should be on a platoon or company basis is a matter for experiment. The writer feels that two platoons of snowshoers to one platoon of skiers will be found preferable to two companies of snowshoers to one company of skiers.

With the company organization, a snowshoe company has not the quick reconnaissance element conferred by the ski platoon in the other organization. All weapon companies, in which the man cannot carry the weapon, must be on snowshoes, (e.g. the mortar and machine gun element) but again a fast reconnaissance element on skis is needed. The organization must be based on the teams who draw toboggans on which their weapons are loaded. Similarly the artillery engineers, medical units, etc. must base their organization on the toboggan team, preferably 6 men.

PERSONAL EQUIPMENT

Supply is the greatest difficulty in the mountains, and this is really based on the load carried by the individual man. This personal load is a most difficult subject. To expect a man to move freely in the mountains and fight with a load of 65 pounds or more on his back is wrong and is almost impossible. That is easily said, but to cut down that load is a much more difficult matter. The rifle and ammunition of the soldier weigh about 15 pounds, and that can scarcely be reduced. A light rifle or carbine would not be sufficiently accurate for the long ranges that obtain in the mountains. But a man has much more to carry than that. He needs dry socks, or his feet will freeze; he needs his mess kit and water bottle or canteen, for he must eat and often cook his own food. He needs some form of sleeping bag, or again he will freeze. Whether a tent is necessary is not so certain. A shovel or spade must be carried but not necessarily by every man. Some form of small cooking stove is necessary if cooking is to be done on a personal basis, but that point will be discussed later. But every man must carry some rations on his person. A change of footgear is again almost a necessity. Ski boots or rubber and leather "shoe-packs" will be wet with perspiration after a day's work in the mountains; and unless these are changed, frostbite and frozen feet will result. Extra clothing to put on at night is again virtually necessary. The great mistake is to have so much clothing that sweating takes place. No one should ever sweat in the mountains. Clothing should be removed when hot, and replaced as the body cools down. But this again means a load transferred from the body to the pack. The best change of footgear is undoubtedly the Eskimo mukluk. It is light and warm and, except in wet snow or slush, excellent in every way and can be rolled up into a small compass.

If the ground permits the main bivouac always being below the tree line, it is a great help; but this will alter in different parts of the world. Trees hide a force from air observation. Boughs plucked and placed on the snow insulate the body and make the bag warmer. An inflatable rubber mattress is a good insulator and most comfortable and might well be incorporated in the sleeping bag. The tent below the tree line may not be wanted at all, and certainly tent poles and pegs will be unnecessary. A hole dug

deep in the snow and covered with boughs and a sheet may well be sufficient. The stove, however, cannot be replaced by a wood fire, as smoke will advertize to any enemy aircraft that the wood is occupied. Whether a stove capable of cooking for a platoon will save the weight on the man is a matter for experiment. The great disadvantage of the individual cooking stove is not only the weight but also the fact that a very tired man will not bother to cook himself a hot meal in the evening and will go to sleep underfed and cold. Again, in the morning, the individual cooking delays the start; and there will be a tendency to scamp cleaning the mess kit, with its attendant evils to health.

Cooking on a platoon or company basis has many advantages, particularly if the food cooked can be kept hot in thermos containers. Whether it is practicable or not is a matter for experiment. A few individual stoves will always be required, however, for patrols, outposts, sentry groups, and the like.

The main savers of weight appear, therefore, to be in the sleeping bag, the tent, the shovel or spade, and also perhaps in the pack or rucksack itself. Clothing must be kept as light and as windproof as possible, too. Before clothing is dismissed, the colour must be discussed. At present, the outer clothing is white on one side, khaki on the other. This is not satisfactory. The white side when worn for a week or so becomes so dirty, particularly from cooking, that the white camouflage effect is largely lost. It cannot at present be cleaned except by chemical means. A simple light slipover white garment of easily washed cloth is preferable. The man can launder it himself when it is dirty and renew its efficiency. For efficiency in the mountains a man should only carry about 30 pounds on his back, and such a reduction in weight is possible.

One piece of equipment is most necessary: that is a cover for the breech mechanism of the rifle and also a muzzle cover. If these are not carried, a fall will pack the breech and muzzle with snow, which will freeze hard and prevent the correct functioning of the rifle. So much for the individual equipment and clothing of the soldier.

TRAINING

The training methods must now be examined. If it can possibly be avoided, a man should not receive his basic training as a soldier and his snow and mountain training simultaneously. There is always a temptation to do this, for snow training is only possible for about 5 months in the year. But if his basic training is undertaken with enough energy to harden him, better results will be achieved than by handicapping a man with having to learn to shoot and handle his arms in the extreme temperatures in which the snow training is carried out. After his basic training is finished and he is fit and hard, the whole day can be devoted to training him in "mountain sense" and snow movement, and

correspondingly rapid progress will be made. All training in snow movement should, with the exception of the very elementary lessons, be carried out on movement across the mountains. To teach a man to ski fast downhill on hard beaten snow is exhilarating and very pleasant for him, but its military value is limited. About 20% of his time as a ski soldier will be spent in this fashion at the most. What is far more important is to give him "an eye for ground." He must be trained to cut a track up a mountainside and through woods at a constant climbing angle; to be able to conceal his tracks by moving close to rocks and through brushwood and trees. Most important of all he must be trained to choose a line of advance that is inconspicuous to the enemy and which will enable those who follow him to maintain a steady even pace, uphill and down, without stopping and starting and backing and filling. All that is far more important than to execute a wild "hooroosh" downhill on easy snow.

The soldier skier must move as part of a unit under the control of his commander and not speed down steep slopes as an individual. To recognize snow conditions, wind slab, breakable crust, dangerous avalanche conditions, etc. is all part of his training and training that can only be done on the mountain side and not on the practice slopes. It may be argued that such mountain sense is only necessary to the leaders—not so. Any man who has to move about in the mountains must learn these arts if he is to be efficient and be able to execute the individual missions that so often fall to the lot of the soldier.

The "eye for ground" and knowledge of snow conditions is also necessary for the snowshoer. To cut a trail along which a toboggan is to be drawn is a fine art, and only to be acquired by experience. Such a trail, if full of sharp turns, and which goes first uphill then down, will quickly exhaust the men hauling it. But a trail cut at a steady climbing angle with wide sweeping turns, which allows a steady pace to be kept and "the team" to swing, will not tire the haulers and will allow a steady pace throughout a column with no "backing and filling."

To sum up the above, the place to train men to live and move about the mountains can only be the mountains. It cannot be the hard packed well used practice slope where every bump and crevice becomes well known.

ARMS OF THE SERVICE

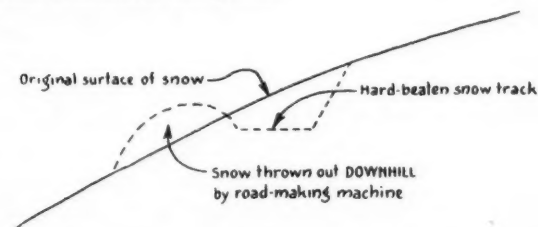
To continue with the specialized training of the various arms of the service. In the infantry, particular emphasis must be paid to rifle shooting, and in particular judging distance in the mountains. In snow the strike of the bullet is hard, if not impossible, to observe, hence the importance of judging distance. The same applies to the heavy infantry weapons—the light mortar, machine gun, and heavy mortar. The heavy mortar will fulfill the role of the

infantry gun or cannon company weapon. Correction of fire by observation is a difficult art in the mountains, and much ammunition must be allotted for training in this subject. Otherwise, the infantry man must be tough, hard, and able to look after and fend for himself, as indeed he must in all modern fighting.

The artillery man must be selected for his weight and physical strength. Unless he is tall and strong he cannot handle the heavy parts of his gun and its ammunition. There are great disadvantages in using pack artillery on mules in deep snow. The chief of these is the great bulk of the fodder required. Even with compressed fodder or cake in lieu of hay, this bulk will be considerable. Another great disadvantage is the necessity for a really hard packed trail. The mule, working barefoot in snow, has small feet, and will sink deeply into a trail packed hard enough to carry a toboggan easily. Mountain artillery should, therefore, carry their weapons on toboggans in deep snow country. Frequently the toboggans can be lifted bodily onto a sled towed by a snow vehicle. As much as possible should be, and obviously will be, made of this type of transport.

The difficulty of observation of fall of shot is the great handicap of mountain gunnery. In deep snow the shell buries itself, in woods the smoke of the burst is practically invisible, especially in a wind. Ranging should, therefore, be by air burst shell. It is a great time saver.

Engineers have four main tasks: the construction and improvement of roads, tracks and aerial tramways; water supply; airfield construction; and the construction of fixed defenses. Of these, by far the most important is the road and track construction. There is nothing new in the construction of roads, and modern power equipment will quickly make a road up a valley. Tracks, particularly traversing the face of a slope are more difficult. Experiments are needed to develop a light angledozer or snowplow which will make a track practicable for snow vehicles quickly. It entails cutting a horizontal sectioned track, and packing the path thus made hard enough to allow snow vehicles to use it. The following diagram illustrates the point:



Some light form of rotary snow plough may be found to be preferable to the angledozer type. The construction of aerial tramways will only be possible or necessary under fairly static conditions. To construct an aerial tramway about one mile long and 2,000 feet up, roughly 3 days are necessary for the

light variety carrying 300 pounds per car, a week for the medium variety carrying 600 pounds per car, and considerably longer for the heavy variety carrying about 1,000 pounds. Engineers must have considerable practice in this in order to increase the speed of erection.

The heating of a water supply to stop it freezing presents a problem, but not a difficult one. Such installations can be quickly and easily erected if the proper design of apparatus has been evolved.

Another task which will fall to the lot of the engineer is the making of air fields and landing strips. Frozen lakes appear to be the obvious answer. In fact, however, considerable work is involved. A lake covered by a heavy fall of snow has not a thick layer of ice on it at all. The snow acts as an insulator, and rests on layers of semi-solid mush. This snow and mush can be consolidated and compacted into a solid mass by pressure, but the process takes time and must be done gradually. Any heavy tracked vehicle will sink right to the bottom on any snow covered lake. Very light tracked vehicles working far apart must be used to start the compacting process, and as the layer of hard snow and ice is created, so can the vehicle weight be increased. A heavy drag towed behind a light tracked vehicle must be used daily to keep the runway in condition.

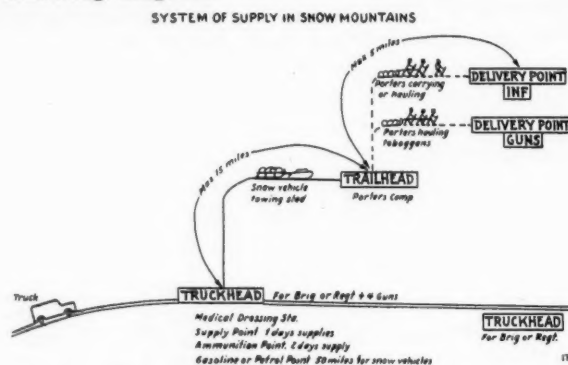
It will take about 10 days or more to make a runway 4,000 feet long by 250 feet wide on a snow covered lake. If any level ground exists, it is probably quicker to make a runway on ground than on a lake.

The construction of fixed defences is a normal engineer problem, complicated by the difficulty of transport of materials to the site, and in the case of concrete, by the abnormally low temperatures likely to be encountered. Aerial tramways are a great help in transporting construction materials to the site and in the subsequent supply of the finished work.

Medical services must have a rapid means of evacuation of wounded and sick personnel. It is more economical to evacuate sick and exhausted men rapidly to a centre where proper treatment is possible, than to try to effect a cure at high altitudes with limited facilities. Evacuation is carried out on a toboggan hauled by men. As the evacuation is generally downhill, a fair speed can be achieved. The patient should be lashed in his sleeping bag onto the toboggan. A chemical heating bag is a help during evacuation. The patient can be then evacuated by snow vehicle to the road and thence by truck or motor ambulance to clearing stations and hospitals. A medical installation near truckhead should exist where exhausted and frostbitten men can receive treatment and remain for a day or so. All soldiers should be taught how to bring a wounded or sick man down a mountainside. Casualties may be carried on the back or brought down on a sled improvised from skis and rucksacks.

SUPPLY

The suggested basic supply system is given in the following diagram.



This supply system hereunder set out will probably require revision after practical experience. It is based on three echelons of transport—trucks running on roads, snow vehicles running on trails, and porters either carrying or hauling their loads on toboggans to the fighting troops along a snowshoe track. The distances given on the diagram are only approximate. The system is based on the supply unit of one platoon. One platoon's rations and fuel are placed on a toboggan at supply rail or roadhead well back, up to 50 miles back or more from truckhead. At this point, bulk is broken down into the platoon unit load and packed on a toboggan. These toboggans are then loaded ready packed onto the truck, transferred at truckhead to a sled towed by a snow vehicle, and finally hauled by the porter echelon to delivery points. As the loaded toboggan is handed over at each echelon, an empty toboggan is handed over in return.

To effect smooth running of supply services, good traffic control, particularly on trails, is essential. Up traffic should have the right of way over down traffic, and passing places must be constructed on the trails. It will seldom be possible or necessary to have one way traffic with an "up" and "down" trail separate.

If this system proves in practice to be unsatisfactory, bulk must be broken at some stage in the supply line. This, however, should be as far back as possible.

At truckhead, one day's supplies, two days' ammunition at normal mountain rates, and 50 miles of gasoline (or petrol) for each snow vehicle is maintained. This reserve must be kept on sleds if possible. These in emergency can be towed down the road by trucks. One truckhead should serve not more than one Regiment or Brigade and attached Troops. The strength and organization of the porter echelons is the key to this suggested system. It is easy to cater exactly for supplies and fuel; ammunition, however, requires much elasticity. The maximum daily demand cannot be catered for, as if this is done, many men will be standing idle in normal

conditions of low ammunition expenditure. It therefore follows that a margin of safety must be allowed, and also improvisation must be undertaken during peak periods.

Under these circumstances, spare artillery gun numbers may have to help the porters echelon haul or carry ammunition to the guns from trailhead. Taking the normal daily weight of rations and fuel to be hauled for a platoon as about 150 pounds, 3 porters could cope with the task provided the unit is situated within 5 miles of trailhead. A spare number is allowed, and the organization is thus based on 4 men (a toboggan team) carrying or hauling supplies and ammunition to each platoon (the supply unit). Allow 16 platoons to each battalion and the figure of 48 porters per battalion is arrived at. Allowing for command clerks, etc., the porter company serving a battalion would be about 60, all ranks. The artillery and engineer porter companies can be similarly calculated. On many occasions, porters may be local natives and would need only supervision and guards. Soldier porters should be armed with a light carbine for their own local protection.

Porter echelons will live at trailheads. Apart from porters, pack animals—mules in particular—consume about 10% of their load daily and will take an appreciable number of men to look after them. Mules are hard to conceal from air observation in their standings. The standings themselves are difficult to construct in the snow, and as has been discussed, their uses are very limited indeed in snow warfare.

COMMUNICATIONS

Communications in snow mountains are not the most difficult problem. Visual signalling by flag, panel, or daylight signalling lamp can often be employed if sending and receiving stations are carefully sited to avoid possible enemy observation. Radio will be the normal channel, when and if the difficulty experienced by the batteries freezing can be overcome.

Telephone and telegraph have the usual limitations, but line maintenance is more difficult in the mountains. Radio is the ideal, but it should be remembered that light radios cannot work through a mountain from valley to valley. Communication to air by radio from the ground is normal and by red panel on the snow is also simple.

AIR

The air factor in mountain warfare is of considerable importance. Every track made in the snow is easily visible from the air or indeed from adjacent mountains, and thus positions are given away. The answer to this problem lies in two directions, first rigid track discipline, and secondly, deception and concealment. Track discipline speaks for itself, when it is remembered that an individual on skis or snowshoes makes as easily discernible a track as 10 or 20 men similarly equipped.

Deception and concealment must be so ingrained in mountain troops as to become habit. Tracks or trails converging on an area must be avoided at all costs. The cover of trees and rocks must be always sought. Trails and tracks must be continued past the areas they serve. Dummy converging tracks can be made simply to unoccupied areas.

During training periods, close touch must be kept with the pilots of observation aircraft, and commanders should make flights over troops on manoeuvres to acquaint themselves with the capabilities of air observation.

As has been said, no wood fires should ever be allowed in daylight, as smoke rising from a wood is a sure indication of its occupation. At night wood fires in stoves inside huts or tents are permissible. The use of lights in tents at nights must be rigidly controlled and the tent efficiently blacked out. Some tents for headquarters and signal centres must be used.

Supply and ammunition replenishment by air needs considerable experiment. Most supplies and small arm ammunition can be dropped without parachutes, and accuracy can be achieved. Parachutes drift with the wind, and their recovery may not only be difficult and even impossible but also the tracks of the recovering party frequently will disclose the position of the troops for whom the supplies are destined. With suitable packing most things can be dropped successfully without parachutes. The simplest form of packing is to enclose the supplies inside several sacks (up to five). One or two sacks will burst on impact, but one or more will retain their contents, and this method has proved successful. Canned or tinned goods are often bent and burst, but if eaten at once the contents are perfectly good. Water in small steel beer barrels can be successfully dropped, but its supply in snow is usually unnecessary.

The type of aircraft most suitable for dropping supplies is a liaison observation craft with a slow stalling speed. High speed aircraft are most unsuitable for dropping supplies, and although large transport aircraft can carry a big load on one trip, they must fly so high to keep out of the turbulent air in mountain valleys that they frequently cannot drop supplies with anything approaching the accuracy that a smaller slower aircraft can achieve.

The liaison aircraft can drop about 1,000 pounds net weight of supplies in one sortie and furthermore can operate from an airfield close to the scene of operations. It can thus take advantage of short periods of good weather. The heavy transport craft has to operate from a large airfield which may be, and probably will be, at some distance from the actual front line troops. It cannot take advantage of local periods of good weather, and the weather may vary considerably between the airfield and the dropping area. Confirmation of good weather in both

areas takes time. About 1,000 pounds of supplies will serve below a half of a battalion for one day on normal ration scales. Thus three sorties will be needed to feed a battalion for one day. To sum up, air supply is unreliable in the mountains and should not be regarded as an alternative system of supply. It is a most useful additional method.

Offensive action by high speed fighter aircraft is not very effective in the mountains, owing to the great danger of flying at high speed in the mountains. A front-gun fighter aircraft finds it difficult to attack troops on the side of a mountain. On the other hand, an aircraft fitted with a turret, such as the British Defiant, can hit ground targets on the mountain side. It should also be remembered that AA fire from ground troops is easier in the mountains than in level countries, as the line of fire is often horizontal and even in some cases downwards. This makes it easier for the individual to swing and aim his weapon.

Bombing against troops on a mountain side is again more difficult than on level ground. A slight inaccuracy of aim will result in the bomb bursting either high above or well below the target. A bomb will, however, sometimes start an avalanche and thus overwhelm troops on the slope below. This fact should be remembered, and avalanche slopes and the ground below them must be avoided.

Light, medium, and heavy bombers can do most effective work in the valleys and areas of level ground.

SUMMARY

Warfare in snow mountains needs highly trained and specially equipped personnel. The organization of the divisions, the weapons, equipment, and transport must be tested in as realistic conditions and over as long a period as possible.

Before any campaign can be started, a special study of the theatre of operations must be undertaken; and local knowledge of weather, snow, and ground conditions must be well known to all ranks. Every effort must be made to get guides and organize beforehand the inhabitants to help the expedition in every way possible.

A special problem exists in overseas expeditions. Unless very strenuous measures are taken, troops will be soft after a period at sea; and on landing, the maximum effort of the campaign may be demanded of them at once. To expect any man to fight at great heights in low temperatures after a sea voyage is expecting a great deal. Ideally, a short period of acclimatization should be necessary. That will be impossible. Therefore, most exacting physical training should be carried out at sea, and ships should not be so heavily loaded with troops as to make that impossible. This physical training needs study.

Finally, all soldiers must be highly skilled in modern war. But the mountain soldier, particularly in winter, needs to be highly skilled indeed. He must be able to fight the enemy and the weather and to defeat them both.

The last war left the German General Staff with two firm convictions. The first was that never again, if they could help it, would they fight on two fronts; and they have got two fronts today. The second was that never again would they be lured into fighting a war of exhaustion. And that is just what Hitler has lately been driven to promise them.

—Lord Halifax.

Air Action Against Combat Formations

[The following article by Lieutenant Colonel A. Vasilyev, Soviet Army, was translated at the Command and General Staff School from the Russian in *Krasnaya Zvezda* 8 December 1943.]

Experience shows that air support of ground troops during both the attack of the forward edge and the battle in the depth of the enemy's defense can be effective only if the bombers, attack planes, and fighters operate *en masse*. The attacking troops expect from the air force first of all the destruction of enemy personnel and matériel, and of those machine-gun nests or fortifications which hinder the further advance of infantry and tanks. And this demand of the ground troops will be satisfied only by the operative massing of air forces on narrow segments of the front in combination with tactical massing. Incessant action against the defensive opponent from the air is necessary throughout the battle, starting with the attack and ending with the consolidation of our troops in the positions they have won.

The continuous nature of blows of the bombers and the attack aircraft on the combat formations of the enemy are based on a number of considerations. Let us cite one of them. A short flight of large numbers of planes, completed just before the attack of infantry and tanks, may knock out a considerable amount of hostile matériel and personnel. It has an effect on the opponent's morale, it confuses him and pins him down. But it is possible to repeat such a fire action only after a lapse of time required for preparation of the second blow. Consequently, the effect of the first attack is unavoidably lessened by however much time the enemy gains for recovering himself and for showing resistance to our attacking troops. The situation is quite different for our troops, if their supporting air forces are above the hostile combat formations the whole time. The air forces then actively cooperate in the attack by systematically destroying personnel and machine-gun nests of the enemy, who at any given moment is hindering the advance of some unit or other of our troops.

The necessity of the tactical massing of the air forces on the field of battle is very clear. We are speaking of strong blows on definite objectives, not everywhere at once. Let us consider the silencing of the enemy's artillery. The air commander, having a certain number of planes, must use them primarily for attacking several of the most dangerous enemy batteries, but should not send out three or four planes against each of a couple of dozen firing positions of the hostile artillery. A spread-out attack in an endeavor to cover the whole field of battle will reduce the effect of the action and lead to dissipation of strength.

It is an inevitable law of all combat and of every operation that it is impossible to be equally strong at the same time on the whole front. For this reason the continuous massed air action on the enemy during the attack is organized in a narrow section of the front in the direction of the main thrust. For action in the combat zone of this narrow section, the air commander uses the greatest part of his strength and resources. However, he by no means disregards the solution of such problems as the fight for air supremacy, preventing the approach of operative reserves of the enemy, etc. For these purposes special groups of bombers, attack planes, and fighters are assigned.

The whole combat task of the air force cooperating with ground troops is planned so as to clear the road for the latter, to accompany them directly with fire from the air on the field of battle, and at the same time to interrupt effectively the efforts of the enemy to move his operative reserves and bring them into action. Naturally, this task can be fulfilled only by maintaining air supremacy, to obtain which the fighter units are called upon.

In order not to give the hostile air forces the opportunity for active interference, and to assure our bombers and attack planes free choice of objectives and independence of maneuver, the pursuit planes must clear the skies of enemy aircraft in the region of combat. To complete this task it is necessary not only to carry on air battles directly above the scene of action of our ground troops, but also to intercept and destroy hostile aircraft bound for the combat area from their own airdromes.

In this battle to clear the sky of enemy planes, the initiative of the pursuit planes should in no way be restricted by definite and primarily defensive assignments. By all means we should avoid those stereotyped methods of combat security for bomber and attack plane action in which the fighters either simply accompany the units which attack the enemy, or merely patrol a rigidly limited area. Such action by the fighters does not correspond to their chief purpose, which is to seek out the enemy constantly and to engage him in battle under conditions favorable to us. Escorting and patrolling must naturally be carried on. But for this only such strength should be detailed as is essential for combating the small groups of enemy planes that break through to the field of battle. The main power of our fighters must be exerted in untrammelled air combat in the

enemy's territory and uninterrupted blockading of the hostile airdromes.

It is always important to expect that the enemy air opposition will increase as the attack operation develops. In an endeavor to gain air superiority, the enemy will move up his air forces from other sections of the front. The magnitude of the air battle will increase. Anticipating this, the air commander must so plan the combat tactics of his pursuit planes as always to have an appreciable reserve on hand. Moreover, in the plan of the whole operation, the prudent and economical expenditure of fighters must be assured. The lavishness sometimes displayed in filling the sky with planes without special reason may lead to a premature exhaustion of resources. Then the fighters are used up before the decisive moment of the operation. Air supremacy on a definite section of the front can be maintained not merely by having a sufficient quantity of aircraft concentrated there, but also by keeping them constantly in fighting condition. This involves the conservation of definite resources, the prompt replacement of losses, immediate repair and overhaul, etc. How important all this can be is shown by the following example. A certain air unit gave out after the first days of battle in an operation. The performance during these days was so poorly planned, and so many unproductive flights were made, that in the ensuing action it was possible to get only insignificant numbers of planes into the air. The others were grounded, either having used up their supplies or undergoing delayed repair.

Having definitely secured superiority in the air, the commander plans and conducts the work of the bombers and attack planes so that the combat formations of the enemy are constantly under powerful and unceasing attack. This means that there must be enough strong units of bombers and attack planes above the field of battle at all times. Independently, and under direct orders from commanders of forces of all arms, they attack and demolish objectives which hinder the movement of our infantry and tanks. First the artillery and mortar positions of the enemy are crushed, then units of his antitank defense. Squadrons of bombers and attack planes above the field of combat must select objectives for attack, and must not be tempted, as sometimes occurs, to bomb and fire upon the whole area of battle indiscriminately.

The striking units of bombers and attack planes must be capable of flexible, independent maneuvers. It has been demonstrated by experience that in the make-up of such groups it is possible to use from six to twelve planes. Their action against the enemy is not limited to a single onslaught. They strike the objectives repeatedly, using their armament in combination, and even make blank runs for psychological effect. In this connection the experience of units commanded by Colonel Stepichev and a Hero of the Soviet

Union, Lieutenant Colonel Vitruk, is very instructive. The fliers of these units usually employ their guns skilfully and with calculated effect. Depending on the nature of the objectives, they first use bombs, then cannon or machine-gun fire, and then bombs again. On the other hand, it sometimes happens that they shoot up the objective first and then, with a few runs, they come down on it with bombs, aiming each one of them. The combat formation in these units is arranged in such a way that each pilot can independently choose and strike his objectives. Most often the formation is in the form of a closed circle above the sector under attack, or an open maneuver by pairs of planes moving in from different directions. In the unit some machines have previously been designated for combat with the antiaircraft positions of the enemy, when spotted. In this way freedom of action is secured for the other machines. The length of time that such units, when well protected by fighters, may remain above the objective is variable. On an average it ranges up to fifteen to twenty minutes. During this time the enemy is not only tied up, but is also actively stricken by accurate fire.

In planning cooperation with the ground troops, the air commander gives particular attention to the relief of echelons, thus attaining continuous action against the enemy. As soon as the first echelon of bombers or attack planes finishes its task, the second echelon should already be on its way to the objective. The commander of the first group attacking the enemy watches the time and the ammunition consumption. He operates so as not to leave the field of battle before the second group comes up. Even if the second echelon should be a little late, the commander of the first group must prolong his stay above the battlefield until the appearance of the following wave of bombers or attack planes. A break in time may sometimes neutralize the whole success attained previously.

Sometimes the air staff does not strictly satisfy the demands of the ground troops for air support. In this connection some staff may gloss over its deficient work with statements of too great an expenditure of strength and supplies. But the simplest calculation shows that it is possible to keep under the continuous action of our air forces that section of the field of battle where the main thrust is being delivered. Let us suppose that this section is equal to five to six kilometers (two and a half to three miles). In order to maneuver freely in the air and at the same time to produce fire of sufficient density, two squadrons, or in all, about twenty planes, can be assigned here at one time. Staying above the objective for twenty minutes, they are relieved by a second echelon of equal size. The second echelon is then relieved by a third, and so on. Altogether, in the course of an hour, sixty planes must be sent to this section. Inasmuch as the organization of a second flight requires at most three hours, it is possible to state that

for uninterrupted and powerful action on the enemy in the direction of the main thrust it is necessary to concentrate 180 to 200 bombers and attack planes. During the day they will complete two to three flights. Estimating probable losses and breakdowns, the roster of planes may be extended to 250 machines. On the present scale of air operations this figure is not very large. With the correct use of this quantity of planes, the results can be great.

In order that not a single flight be a blank, but that on the contrary each bring the greatest possible aid to the ground troops, these latter are strictly obligated to cooperate fully with the air forces, as arranged in the plan of battle. The infantry indicates its forward edge to the echelon commanders and even to individual machines. It also points out objectives for the fliers and directs the attack on them. This is easy to accomplish by means of artillery and mortar fire, smoke shells, machine-gun bursts of tracer bullets in the direction of the objective, display of signs that can be read from the air, etc. Target indication by radio is of course not excluded.

Precision of command is of especial importance in the organization of massed, continuous air action on

the enemy. The air commander directing the work of the bombers, attack planes, and fighters on the battlefield must personally follow the activities of the air forces supporting the ground troops. It is necessary to react quickly to all their demands. Sometimes direct intervention in the flight of one or another of the echelons may be required. For this reason the command post of the air chief is not located in the center of the network of airdromes, but is moved forward in order to assure direct communication with the commander of the force of all arms, as well as uninterrupted observation of the field of battle and the activities of the planes. Air liaison officers must be in the units of ground troops supported by the air forces. Being in communication with their commanders, they will accurately direct the alternating echelons of bombers, continually inform the air staff about the situation, promptly warn about mistakes, etc.

The continuous action on the enemy from the air during attack is a complicated and responsible problem. It can be solved by an accurate calculation of strength and means, precision and flexibility of command, and correctly organized combat security.

Scoring Enemy Air Losses

The American system of estimating enemy air losses is modeled after the very careful methods used by the RAF. The rules are simple. In order to claim the destruction of a plane, the Americans must: (1) see it crash on the ground or in the sea, (2) see it disintegrate in the air, (3) see the pilot bail out. There are few borderline distinctions. If the engine catches fire, the plane may not be claimed as destroyed; but if the entire fuselage bursts into flame, it may. Planes can be claimed as probably destroyed when they are seen going into spins, out of control, or simply on fire.

Since as many as nine gunners may have been firing at the same plane, the crews are carefully interrogated after each raid. This questioning is unusually thorough and sometimes communiques are not issued on enemy losses until five days after a raid. In a few instances, the Eighth Air Force in Britain has never issued any claims as to the number of German planes it shot down.

One of the main rumors circulated about American claims ran to the effect that in the big raid on Lille last October the number of planes reported to have been destroyed or damaged was larger than the number the Germans sent up that day. The air forces now admit that on this particular occasion there was some confusion and the premature release of figures exaggerated the number claimed probably destroyed but not those certainly destroyed.

Since that time the United States Army Air Force has tightened up its methods of assessment until some fliers privately call it "absurdly conservative." In addition to that, the Eighth Air Force has entirely stopped the practice of claiming probables. Its figures now include those enemy machines shot down for certain on the basis of the rigid tests established by the high command. (Extracted from *Newsweek* 15 February 1943.)

Cavalry—Employment of Mechanized Reconnaissance Elements

LIEUTENANT COLONEL JAY C. WHITEHAIR, *Cavalry*
Instructor, Command and General Staff School

Because of memories of the last war and augmented by such operations as the siege of Stalingrad and siege of Bataan, many officers believe that the great decisions in today's battles will come from static or position type of warfare, believing also that war of maneuver ends either in this type of action or is purely a sidelight. With this as a background, it is very easy for them to discount the use of their mechanized reconnaissance elements for pure reconnaissance purposes.

However, let us listen to the report of a German staff officer, Colonel Soldan of the German Army. Colonel Soldan is telling of his visit to the "Front" during the great German drive to the Northeast in which Germany reported the capture of over 300,000 prisoners and the destruction of 26 Russian divisions. I quote:

"We arrived at a little town. The street was empty. We observed the familiar marks of combat where fighting had been taking place. I *was* and *was not* in the very front lines. I knew that many kilometers beyond this town a German division had already entered Smolensk. But the front is *everywhere*. Even to our right front, 150 kilometers distant, an infantry division was still fighting against the encircled enemy. This division was *also* at the front although German units were already fighting much farther eastward. In the intermediate area, however, hostile forces were still in combat. The same could be said of the area *farther forward* to the *right* and to the *left*."

Get this picture, divisions fighting in areas separated not by miles but by scores of miles. What a perfect situation for lightly armored mechanized reconnaissance units. Picture the need for liaison; for constant never-ending search for information of the enemy; the possibility and probability of surprise from any angle; and this, the scene of the destruction of a sizeable portion of the Russian Army.

And yet here is what we find happening in a theater of operations noted primarily for the maneuvering of the opposing armies—Libya. I quote from a report of last year:

"The disastrous results of a lack of armored-car reconnaissance in Libya was demonstrated one afternoon in November, when a German column succeeded in *slipping* to the left flank of an armored regiment and later captured its headquarters and most of an

adjacent infantry regiment. Another instance occurred three days later, when a large German anti-tank unit supported by tanks was able to site its guns about 100 yards from an allied regimental bivouac under cover of darkness and open fire at daybreak."

Please note that the first notice the British had was when the enemy actually struck and started inflicting casualties. Needless to say, the British learned their lessons in reconnaissance, as has since been proven. The big question facing us is: Are we intelligent enough to use this knowledge or must we also pay the price of learning in terms of blood and losses?

Today our farthest reconnaissance agency is our Air Force—our eyes in the air—and let nothing that I may say be construed to take away one iota from the tremendous power and value of this agency. It is so essential that no operation can be certain of successful conclusion without the help of these air-eyes. However, there are certain limitations which must be intelligently considered at all times: the weather—can we count on it at any given time; the probable use of all available cover by the enemy to screen his movements, strength, and composition; the possibility of enemy air superiority; the lack of detail which the Air Force can furnish. And, so it is necessary that we supplement our air-eyes with our ground-eyes at every possible opportunity. Here is where we find the maximum use of our mechanized cavalry.

All large units of our army (with one or two exceptions) have within them organic mechanized reconnaissance agencies. Each of these agencies has been tailored in both size and equipment to perform the reconnaissance tasks which will most often be required.

The infantry division has a reconnaissance troop. The motorized and cavalry divisions have a reconnaissance squadron which is somewhat larger than the division reconnaissance troop. This squadron has within it a support troop. The corps has a reconnaissance regiment which is half again the size of the reconnaissance squadron.

Let us discuss, first, the reconnaissance troop. There has been such a wide-spread misunderstanding and misuse of this troop that it is absolutely necessary that staff officers learn its capabilities and limitations. One needs only to observe a few maneuvers

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to realize that many officers think this troop is a small armored division, heavy with sustained firepower, supply facilities and shock action. It has been used for seizing and holding objectives which were already held by a strong enemy force. It has been used to protect assembly areas for a regiment or even a division and ordered to hold the assembly area "at all costs" even with an enemy division driving into the area with everything it has. It has been ordered to act as the *only* security on a flank where the enemy was bristling with tanks and tank destroyers. It has been used as a task force to attack strong enemy positions.

What force is available for these man-sized jobs? Less force than can be found in an infantry company. There are more automatic weapons, certainly, but the ammunition that can be carried will not last more than a very few minutes in active combat. Then there is nothing. They are usually too far out for rapid resupply so their battle life will be very short.

The personnel, small as it is, has only 30% basics or riflemen who can easily be replaced by a request on G-1. The rest are radio operators, noncoms, mechanics, drivers, etc.

This must be understood fully when a decision is made to "fight" this troop.

(It is interesting to note that in the cavalry regiment: 31% are officers, noncommissioned officers or technicians; 44% are specialists and only 25% basics and riflemen.)

Let's go on to the reconnaissance squadron.

The reconnaissance troops which are in it are exactly the same as the reconnaissance troop of the infantry division, except that they do not have the liaison section found in the headquarters platoon of the latter.

General Scott, when he recently returned from Libya, made the comment that reconnaissance which is not able to fight for its information is not worth its salt, much less its road space. The support troop has been included in the reconnaissance squadron and the reconnaissance regiment to furnish this power.

When the enemy has successfully formed its screen, it prevents our reconnaissance patrols from penetrating further into hostile territory. The support troop is called into action to force an opening in this screen to permit the unarmored elements to go through and continue their work.

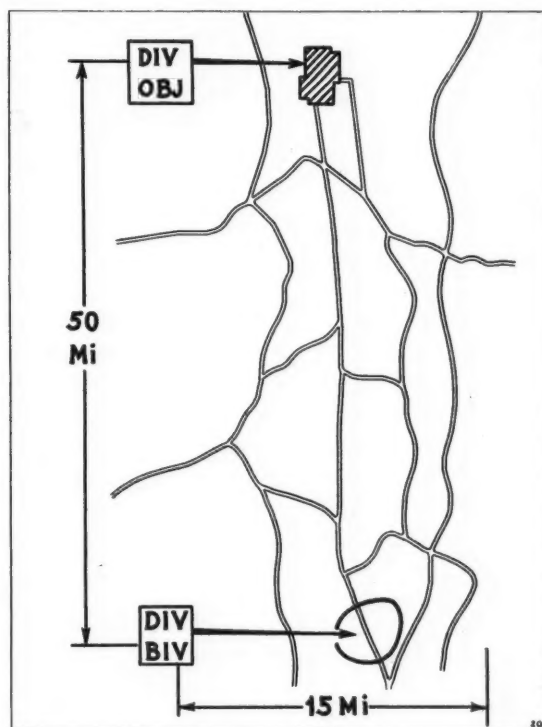
This troop is the Sunday-Punch on Reconnaissance. It consists of a headquarters and 3 platoons of light tanks.

It is strong in light shock action but not against armored units nor against antitank guns—heavy in firepower but for only a relatively short time. Remember always that this unit is not equipped to *hold* a position.

The reconnaissance regiment's reconnaissance troops are exactly like those of the squadron. Its support troops are basically like the one in the squadron, but each of the support troops in the regiment has a platoon of self-propelled (in half-tracks) 75-mm howitzers included. Their primary targets being enemy antitank guns and machine guns.

These are the tools which are available. But how should we put them to work?

Let's go on a reconnaissance with the reconnaissance troop of the division. The scene is the command post of the 1st Division. The time is around midnight. The division G-2 is talking to Captain Jones, Commanding Officer of the 1st Reconnaissance Troop. They are standing in front of a map (represented by following diagram):



"Jones, you got my warning order just before dark tonight. I am sorry I wasn't able to get it to you earlier. However, it was just at that time that we got the Corps Order.

"We move tomorrow morning before noon to secure the town of 'X', which is about 50 miles from here. (Indicates division objective on map.) Corps won't be up here with us for about two days. As I guess you know, the Corps Cavalry Regiment is operating in another area. We don't know very much about the roads, bridges, and terrain nor very much about what Axis forces may be out in front of us.

"We sent out an air mission tonight just before dark but received no positive information. We are sending out another air mission at daylight. It will be in your net.

"Jones, I want you to move at dawn to 'X.' We will move about 4 hours later. I want to know the conditions of the roads, bridges, and terrain; and I want you to help us out on this because it may be that we will have to fight before we reach 'X.' In that event, I want you to get back to the command post as quickly as you can and tell us everything you can about the ground we may have to fight on.

"We also want to know about the presence or absence of any Axis forces and any critical features of the terrain which you may pick up. Of course, in accordance with your SOP, we will absolutely want immediate report of first contact with the enemy, and if it's tanks or airplanes—put it on your flash warning net; otherwise report to us hourly and on your arrival at 'X.'

"The division command post will move on this central road.

"Are there any questions?"

Note that G-2 included in his order to the troop commander *where, when, what, why*, but not *how*.

Every member of the reconnaissance troop has been trained and realizes fully that communication is the most important feature of every reconnaissance. There are within this small troop more radios than can be found in an entire infantry regiment.

Every man knows that communication is the very soul of reconnaissance. *The information must be gotten through.* If the radio fails, then there are the motorcycles or scout cars or bantams or impressed vehicles—anything as long as information gets through!

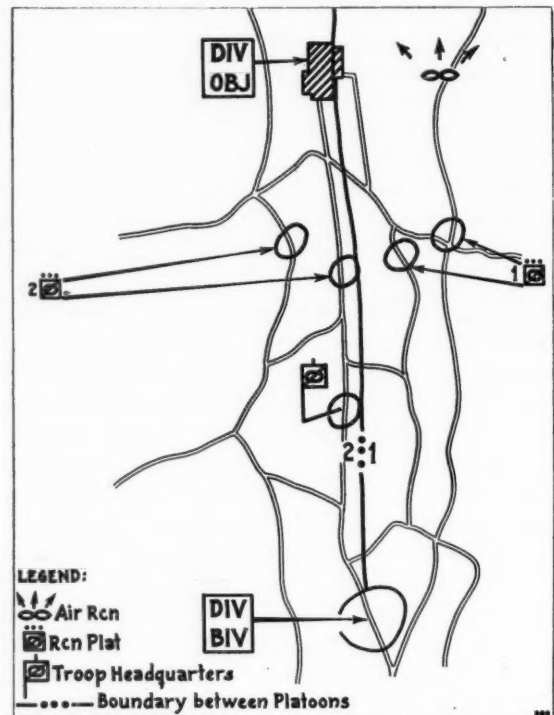
Note that the distance is about 50 miles and that the width of the zone to be reconnoitered is about 15 miles, which on a road net of this type is fairly normal. Note, also, that the Division G-2, realizing that the division could travel at 25 miles per hour, but that the troop could reconnoiter normally at only about 10 miles per hour, gave the troop sufficient starting time so that it could go beyond the division objective before the division arrived there.

(It might be mentioned here that the reconnaissance regiment might be assigned a mission of this same type, but with the distance extended to 100 or 150 miles and the width of the zone varying from 45 to 70 miles. The width of the zone depending on whether this is an individual mission lasting for a day or two, in which all the troops may be put on the line; or whether the regiment will be in *continual* use, which will necessitate holding one or two troops in reserve for rest and reconditioning.)

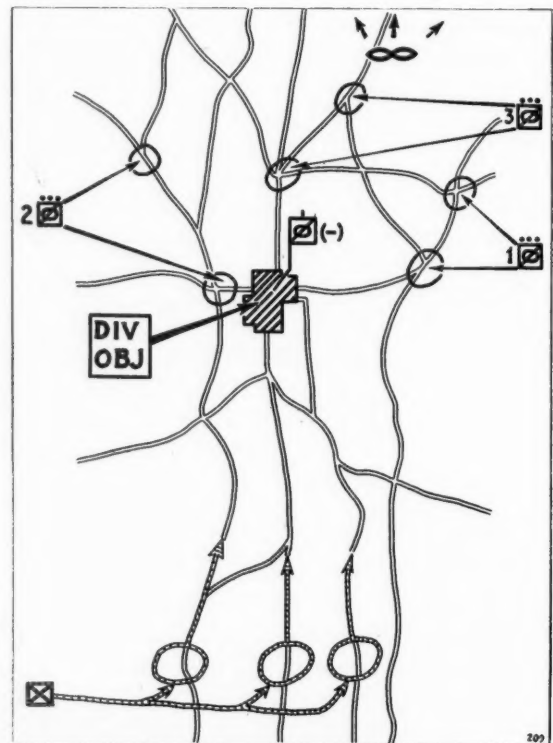
Now let us look in on the troop the following morning.

The troop is on the way. The troop commander has divided his zone into two platoon sectors. The 2d platoon is on the left covering two roads, a section to each road. The 1st platoon is on the right. The troop less detachments is moving down the center road

which we can call the axis of reconnaissance. The individual sections are moving forward by bounds.



This means that each car is covering the car ahead of it until it arrives at a critical terrain feature where



it will stop and the car commander will carefully observe the terrain before him.

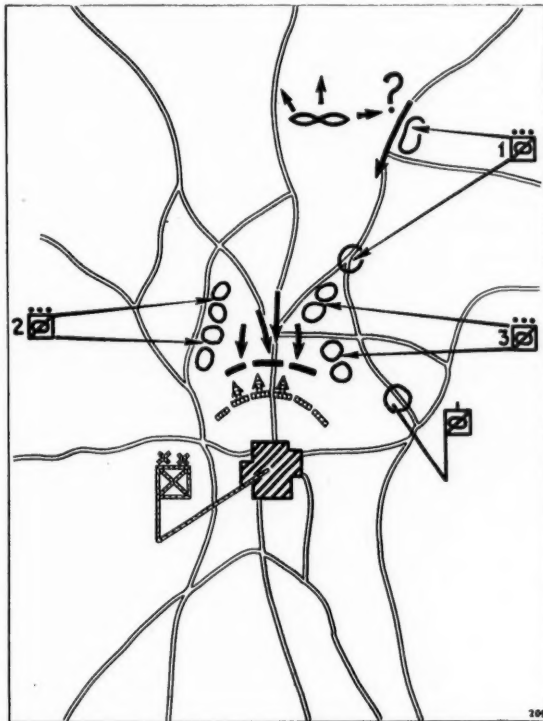
CAVALRY—EMPLOYMENT OF MECHANIZED RECONNAISSANCE ELEMENTS

When he has found all is clear, he will so signal and the following car will close up at increased speed and immediately either leap-frog the position or again cover the advance of the first car.

Let's advance the time by a few hours.

The troop has arrived at the division objective; but it doesn't stop, for its work has just begun. It has found that the route is clear, that there is no enemy; and, after a careful reconnaissance of the town, has reported "all clear" to the division. Now it starts to fan out and form a circle of reconnaissance around this town so that the division may not be surprised from any angle.

The troop commander has decided it is time to commit the 3d platoon as his area is now much larger. (The distances on the diagrams are not to scale and the individual sections will be out further than is here shown.) The division is now on the move and approaching its objective. Now let's carry this situation further.



The division has arrived at its objective. An air mission has reported the approach of an Axis column which elements of the reconnaissance troop have picked up. This report was passed on immediately to the division command post and the division was immediately ordered to deploy and move out to the proper distance to secure the town.

The 3d platoon of the troop which had been in front of the Axis force fell back but kept constant contact. As the Axis deployed into line of battle the 3d platoon moved out to the east flank searching for information as to the extent and strength of this flank.

The 2d platoon which had been notified by radio of the Axis approach closed on the west flank, also searching for information; while the 1st platoon circled the entire area to the northeast to intercept a second Axis column which had been reported by an air mission and to watch most carefully the movement of this new force.

This is battle reconnaissance.

You will note that the troop was not ordered to fight, but rather to get the information which the commander so vitally needed to properly dispose his forces.

Here we will leave the troop to continue its battle reconnaissance.

While reconnaissance is the primary mission of these units, it may nevertheless be necessary at times to employ them on other types of missions.

A mission of counterreconnaissance may be assigned to these units with expectation of success if the job ordered is not too big.

It may be well to mention here that, whereas *counterreconnaissance* may be very successful at night by reason of the opportunity afforded to ambush enemy reconnaissance units, reconnaissance at night may be a most hazardous and unprofitable operation. This is especially true if, by reason of the distance of an assigned mission, it is necessary for the reconnaissance to be made entirely mounted. Then the vehicles must advance on the road at three to five miles per hour and trust in a kind Providence, as their first notice of the enemy will probably be an aimed shot from an antitank gun.

Anti-paratroop and anti-glider missions are ideal for mechanized reconnaissance units; and it must be said that the threat of a paratroop attack is no longer something that may be relegated to the Sunday supplement of the newspapers, as it is an ever-present threat to any division while fighting against such enemies as the Germans and Japanese.

Paratroops are most vulnerable immediately after landing. They have not yet gotten to their "bundles." They do not carry heavy weapons to penetrate even light armor and they are completely disorganized for the first few minutes. If seconds and minutes are ever valuable in the life of any division, they will be at the moment of the landing of paratroops.

The mechanized reconnaissance unit is the fastest means of carrying light firepower and light shock action against unarmored troops. But it is necessary to have the reconnaissance unit in the air warning net, and to have already issued the orders for road priority. It is important to let the unit know as far in advance as possible that this is to be its mission so that its officers will have personally reconnoitered possible paratroop objectives and quickest available routes thereto.

Mechanized units may at times be valuable in encircling maneuvers. But certain questions must be

answered before assigning the mission. Against what type of force, armored or infantry? If the mission is to be a distant mission, can you supply them? Are they capable of performing the mission without reinforcement? If not (which will probably be the case) then specifically what reinforcements can you give them?

Probably the division reconnaissance troop is not of sufficient size or strength to use in this type of mission. However, if it is important enough the reconnaissance squadron or regiment properly reinforced may here form a very valuable task force.

Consider the use of these units in pursuit.

The same principles apply here as apply in the matter of encirclements. The reconnaissance unit may be of *special* value in this case in harassing the heads of the retreating columns from a flank or in destroying the means to pass a defile along the route of the enemy's withdrawal.

It will be normal in pursuit to use the reconnaissance elements (if used at all) as part of the encircling force rather than as the direct pressure force.

Given sufficient time and space allowances, the units may prove very effective in missions of delay.

One cannot expect reconnaissance elements to delay by taking up one position and holding it for any length of time, for actually they can remain at any one position just about the length of time that it takes the enemy to discover their exact location and to attack it.

Their maximum value in delay will be found in hit-and-run tactics especially against unarmored motorized columns. Here they can fire into the head of a truck column with all of their weapons, force the enemy to dismount, deploy on foot. He must also withdraw his vehicles, or at least get them off the road and under cover. Our mechanized units will then stay until that moment when a decisive engagement is imminent and will then leave the scene at top speed to repeat the procedure at the next favorable terrain feature.

The mission of security has been assigned in a great many cases without a full understanding of the real meaning of the task involved.

Security is usually ordered for the flank of a large force.

Let us read a paragraph from a German field manual entitled: "The Armored Division."

Because of the nature of its composition, the motorized reconnaissance battalion (incidentally more heavily armored than ours in proportion to its size—JCW) is not suited for defensive mis-

sions. For example, an open flank may be watched over by long-range reconnaissance but *must be protected by other troops.*"

That statement—from those who have paid the price of error.

Reinforce your reconnaissance units if you want *security!*

It may be all right to put a symbol on the map showing that there is a reconnaissance unit acting as security; but, unless it has been reinforced, the enemy may never know that the map has been so marked.

RECONDITIONING AND REST.

There is an opinion wide-spread in the Army that mechanized cavalry rides to war, and by so doing is not subjected to the rigors and exhaustions of other arms; but the fact remains that there is no more nervous or tiring sort of work than reconnaissance. Every bush is an antitank gun, every defile a protected strong point until proven otherwise; and on a proper reconnaissance the personnel spend as much time running on foot as they do in their vehicles.

Each man knows that he will finally be shot at. In fact, that is the way his first contact with the enemy will probably be made.

There can be no moment of relaxation on any reconnaissance, either night or day. The vehicles themselves will be traveling from 100 to 200 miles per day and in some cases 300 to 400 miles per day. The radios will be in use 24 hours per day. If one expects continued efficient reconnaissance, plans must be made and *executed* for periodic reconditioning of vehicles and equipment and rest for the men.

Mechanized reconnaissance is a G-2 agency. G-3 will want the units seven days a week; and it is perfectly proper for him to want them, for they *can fight*. But it will probably be a command decision when they are used for combat missions; for, in so using them, the commander's ground-eyes may be blinded for a long time. For in serious combat their battle-life is very short, and this specialized personnel will not be easily replaced by merely making a request on G-1.

Consider these six "R's" of Reconnaissance:

1. Reconnaissance units are for reconnaissance!
2. Restrict combat missions to vital needs!
3. Reinforce them when we fight them!
4. In Reserve when no proper mission!
5. Resupply them on distant missions!
6. Rest and recondition them every chance we get!

The Activation of a Division

LIEUTENANT COLONEL R. H. HOBBS, *Field Artillery*
Instructor, Command and General Staff School

The mechanics of the plan we are working under are relatively simple. When a division is activated, it receives its personnel as follows. First, from one of the existing divisions which is called the parent unit a nucleus of trained officers and key enlisted men known as a cadre. Second, it is assigned sufficient additional officers and raw recruits to bring it up to 5 per cent above its authorized strength. These raw recruits are called filler replacements.

After spending 37 weeks in training, the division then receives additional instruction in special operations such as amphibious operations, mountain operations, etc., depending on what it is to be used for, and the division is then supposed to be ready for combat. After the division has completed about half of its training period, which is referred to as its training year in spite of the fact that it only consists of about 37 weeks, it must in turn provide a cadre for a division that is about to be activated. It then becomes a parent unit itself. The 5 percent over-strength previously referred to provides for part of the cadre. Thus our divisions create new divisions. As time goes on a division may be called upon to furnish several cadres. When the need for an additional cadre is anticipated, the strength of the division to provide it is increased sufficiently to compensate for it.

How does this all work out? I am going to use the X Infantry Division as an example. This division is to be activated at Camp ----- on May 15, 1943. The date of activation is known as D-day. The Division Commander, Chief of Staff, General Staff, Special Staff, the Division Headquarters Company Commander and the Reconnaissance Troop Commander are now here at the Command and General Staff School receiving a refresher course.

The Division Commander, Assistant Division Commander and the Division Artillery Commander, in other words the three general officers, were designated by the War Department prior to February 5, 1943. The Chief of Staff was designated by the Commanding General of the Army Ground Forces prior to that same date. Incidentally the Chief of Staff is the only officer whose selection the Division Commander has anything to do with. These four officers were directed to report at the headquarters of the Army Ground Forces on February 15th. They spent that day and the next two days there receiving their instructions and the next 8 days at the Ordnance Automotive School and at the Ordnance School receiving a refresher course on automotive and ordnance equipment.

Let us leave them a moment and consider the General Staff and the Special Staff. The G-1, G-2, G-3 and G-4 were all designated by the Commanding General of the Army Ground Forces, while their assistants and the Division Headquarters Company Commander were designated by the parent unit which in this case is the Q Infantry Division. The Special Staff consisting of the Ordnance Officer, Chemical Officer, Judge Advocate, Inspector General, Adjutant General, Division Engineer, Division Quartermaster, Division Surgeon, Division Signal Officer and the Provost Marshal were designated by the chiefs of agencies concerned, while the Reconnaissance Troop Commander was designated by the Commanding General of the Army Ground Forces. All 19 of these officers were designated prior to February 5, 1943.

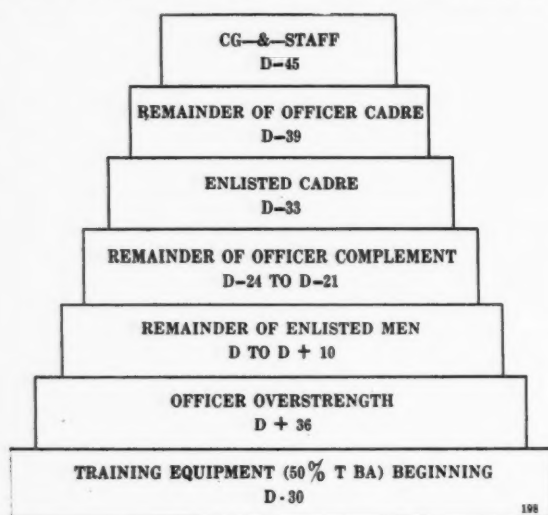
The Division Commander, the Chief of Staff, and the 19 officers just referred to arrived at this school—namely at the Command and General Staff School—on March 1st to attend a special refresher course for 4 weeks. I shall go into detail in regard to that course a little later on.

The Assistant Division Commander and that portion of the cadre known as the infantry component, which consists of the infantry regimental commanders, their executive officers, staff officers, battalion commanders, battalion executive officers and company commanders reported to the Infantry School at Fort Benning, Georgia, for a similar refresher course on March 8th. Likewise the Division Artillery Commander and that portion of the cadre known as the artillery component reported to the Field Artillery School at Fort Sill, Oklahoma, for a similar refresher course on that same date—namely March 8th. Similarly, the Engineer Component—Signal Component—Medical Component—Special Services Officer—the Chaplain Component and the Division Postal Officer attend special schools during the same period.

This chart shows how the various component parts of the cadre and the filler replacements arrive at the place of activation of the division, which in this case is Camp ----- . The Division Commander and the other officers attending the special refresher course at this school are scheduled to arrive at Camp ----- on D — 45; in other words, 45 days before the date of activation of the division. D — 45 corresponds to March 31st. Sufficient chauffeurs to take care of their needs also arrive at that time. Transportation will be furnished to them temporarily by the station complement, that is by the permanent

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personnel at Camp -----, who will also turn their quarters and the equipment that goes with them over to them. The next important group to arrive is the remainder of the officer cadre consisting



of about 187 officers. It comes in on D — 39 which corresponds to April 6th. These are the officers who will have been attending the other special refresher courses; namely, those at the Infantry School—The Field Artillery School—The Engineer School and so on. The enlisted personnel arrive on D — 33, which corresponds to April 12th. This group consists of approximately 1300 key enlisted men. Three trains will be required to bring it in. The next group to arrive is the remainder of the officer complement consisting of 471 officers. It arrives over a period of 4 days; namely, from D — 24 to D — 21. These officers come from replacement pools. The remainder of the enlisted men, namely, the filler replacements consisting of approximately 13,000 men come in over a period of 11 days starting on D-day and ending on D+10.

So much for that. The equipment required for training begins to reach the Camp on D — 30 and should be on hand in time to enable the training to commence on D+15. As previously mentioned, the date of the activation of this division is May 15, 1943.

Now let us go back a few weeks to the time when we were notified that the X Infantry Division would be activated on May 15th, that it would be trained at Camp ----- and that the Division Commander and certain other officers would take a refresher course at this school. That information came to us sometime in January. At that time the Commandant of this school selected one of his instructors to proceed to Camp -----, and make a reconnaissance of conditions at that camp. This is a regular policy. Instructors are sent out to reconnoiter the camps, posts or stations at which all new divisions are to be activated and to bring back such information and maps as may be useful to them and as may enable us to so arrange the instruction we give them at this

school as to take into consideration the conditions they will actually find at the particular camp, post or station at which they are to train and the local conditions and peculiarities thereof.

Camp ----- is a large, modern, well equipped camp. It is what we refer to as a three division camp which means that three divisions can train there at one time. Actually there is room for about 70,000 men. At present the Y and Z Infantry Divisions are there along with numerous Corps and Army troops.

The buildings there are of the theater of operations and hutment type. The theater of operations type are 20 x 100 feet standard, light wooden buildings covered with building paper. A series of these buildings are hitched together to make a headquarters. The hutment type resemble large tents but are made of wood.

The maneuver area consists of thousands of acres of gently rolling partially wooded terrain. The training aids, by which we mean the obstacles courses, rifle ranges, artillery ranges, and so on, are all in excellent condition and ample in every way. A large area has been cleared for an artillery impact area—that is the target area in which the artillery of this Infantry Division will fire. The buildings they will occupy are completely furnished and ready for occupancy. The warehouses, in which their equipment, referred to by the Army as the TBA equipment, will be received, are empty and ready to receive the equipment as soon as it commences to arrive. The station complement is ready to unload the equipment from the cars.

I have gone into this in detail just to show you that in the case of this particular division, the camp in which it is to train is ideal and complete in every respect. This information was very welcome to General -----, the Division Commander of the X Infantry Division and to his Staff. Some divisions have not been as fortunate; in fact, many of them have been obliged to move into camps that were not complete. It is in order to obtain information of this type and in order to assist us to help the staff to solve its problems that the Commandant sends Instructors out to make reconnaissance on the ground.

During this reconnaissance the local conditions are, of course, gone into in detail with the Camp Commander and the nearby towns are visited to check on them personally. Such matters as housing, schools, hospitals, transportation, recreation, liquor, prostitution, and so on are investigated. In other words, all the information which the Division Commander and his Staff might require is secured. Detailed maps showing the maneuver area, the location of the camp, the training aids, layouts of the buildings and so forth are also brought back.

Now regarding the refresher course at this school. The first two weeks are devoted to bringing the

THE ACTIVATION OF A DIVISION

students up to date in such matters as organization, staff procedure, the capabilities and limitations of the associated arms, the general principles of combat and so on. The various members of the staff are given training in the subjects they are specializing in. The third week is devoted largely to map exercises designed to bring out the principles we have preached during the first two weeks and to give the students an opportunity to solve a few problems. The fourth week is what we refer to as the "welding week." During that period, the staffs function as groups under the direct supervision of their own division commanders who are thus given an opportunity to determine the capabilities and limitations of the various members of their staffs. During that period, the staff goes through two map maneuvers designed to give practice in staff procedure and staff coordination. Three field exercises are worked out on their own maps—that is on the maps of the area in which they will train—and they are given a very important 4-day problem which we refer to as "Initial Staff Tasks—Organization of New Divisions," during which the staffs work out in detail the plans for the administrative period—that is for the period D — 45 to D + 15 which comprises the period starting with the arrival of the Division Commander and the staff group which trains at this school at the place of activation to the day on which the training year begins. In addition, they make up in considerable detail plans for their training year. This work has been found of immeasurable value by all the division staffs that have gone through this school and all have reported that it has simplified their work tremendously and that in view of the reconnaissances made for them by our Instructors which enable them to make their plans on their own maps and with knowledge of the conditions they will find at their places of activation, very few changes have been found necessary. So much for the refresher course given at this school.

Now, we will cover another series of reconnaissances made by us which also have been of great value in assisting us to make the instruction we give these staff groups realistic. Instructors are sent to visit divisions during various phases of training. These Instructors talk to the Division Commander and the General Staff Officers and to the other officers of the division in order to determine the problems they have encountered and the manner in which they have solved them. This information is then brought back to Fort Leavenworth and incorporated in our instruction. For example, it has been found that during the administrative period—namely, the period D — 45 to D + 45 previously referred to—the G-1 and G-4 are tremendously busy while the G-2 and G-3 have very little to do in so far as intelligence or training are concerned. In certain divisions, the G-3 has been used to assist the G-1 and G-4, while the G-2 has been used to handle the many

troublesome problems connected with public relations which seem to arise every time a division is activated. I say troublesome only because they are problems that take a lot of time. In the case of one division it was found necessary to form a public relations team consisting of the G-2, the Judge Advocate, the Provost Marshal and the Division Surgeon during the administrative period because in spite of the fact that the Camp Commander had already established relations with civil authorities, chambers of commerce and similar agencies, every one of them wished to entertain or interview the division commander. Obviously, it was impossible for him to see them all. So this team, which was headed by the G-2, spent several weeks interviewing civil authorities, chambers of commerce and so on in nearby towns.

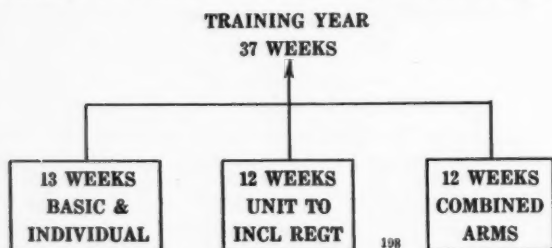
These may appear to be trivial matters but it has been found advantageous to warn the staff officers of these problems and to prepare them in advance. There are a few other matters that might be of interest to you. Arrangements must also be made with the parent unit so as to avoid what happened in the case of one division where the three trains bringing in the entire enlisted cadre of about 1300 enlisted men arrived at the same time about two o'clock in the morning. As previously stated these reconnaissances are made periodically and our instruction is thereby kept up to date.

Now, here is an interesting problem which is faced by all new divisions—namely, the problem of reception, classification and assignment of the 13,000 odd filler replacements. There are a number of different ways of handling this problem but here is one which seems very simple to me and which has been found satisfactory by several divisions. Arrangements are made to have the filler replacements report at the rate of 700 men the first day up to a peak of 1500 men until all 13,000 odd have been received. Four reception teams of four officers and 70 enlisted men each are formed for the purpose of receiving these filler replacements. The cadre of each infantry regiment provides a team while the cadre of the division artillery provides the 4th team which is used for emergencies only. Under this system, each of the three active teams meets a group every third day and conducts it to barracks in its own infantry area where the group is subjected to an immediate physical examination and is then given an opportunity to bathe. Each group is quartered and fed by the team that meets it until it is assigned. It is estimated that an average of about 36 hours elapses between the reception and assignment. The filler replacements are assigned horizontally throughout the division by specialists of the Adjutant General's Department working under the supervision of the G-1 Section. Of course, the teams must be given several practice runs in advance. Each group receives some exercise and training while awaiting assignment. I

would like to mention that filler replacements are now going direct from reception centers rather than from replacement centers which means that they have only been in the Army for a few days and know practically nothing about the Army.

For a while, there was a considerable delay in the arrival of the filler replacements. This situation now appears to have been remedied, but it must be borne in mind when making plans. A few months ago there were a number of divisions in training which only had their cadres and which had to await filler replacements. This, of course, meant that they were delayed by just that much. In the meantime, they trained their cadres.

The next thing to consider is the training year which I shall cover very briefly. This chart shows that 13 weeks are devoted to basic and individual training, 12 weeks to unit training and 12 weeks to



combined training. During the first period, the soldier is taught such things as marching, the use of various

weapons, and so on. The training progresses to include the company or similar unit. During the second period, the training includes the regiment, while the third period is devoted mainly to combat team exercises. Stated in another way during the:

1st Period: We make the individual into a soldier.

2nd Period: We make the soldiers into an organization.

3rd Period: We make the various organizations into a combat team.

When the 37 week training year has been completed the divisions receive specialized training based on what they are to be used for. They participate in field maneuvers, receive training in amphibious operations, the assault of fortified positions and so on. It is estimated that a longer time will be spent in training in this country so the 37 week training year is actually just the beginning. When the divisions are ready to be moved to an active theater they are sent to a port of embarkation and loaded into transports. When they finally arrive abroad it is contemplated that they will spend about two months becoming acclimated and undergoing a final training before entering combat. Thus you see that it takes time to train a division. This is not a war for amateurs. That has already been clearly demonstrated. We need well trained troops and lots of them.

The R.E.M.E.—A New Development

Recent British military literature has contained frequent references to the good work of the R.E.M.E. (Royal Electrical and Mechanical Engineers). The editor of The Army Quarterly (London, August 1942) comments as follows on this important development of the past year in the British Army.—Editor.

It is doubtful if there will be any sadder or less satisfactory chapter in the history of the British Army than that which sets out the manner in which the vital problems of the selection, design, production, and maintenance of its equipment has been dealt with. At long last—some twenty-five years to be exact—the mechanical maintenance services have been combined into one, and R.E.M.E., as it has already been dubbed—the modern equivalent of the Royal Army Veterinary Corps—is the result. To the writer this is a source of great if belated satisfaction, as the organization which he put forward after assuming command of the First Armored Force in 1927, is much

the same as the one which has been finally adopted. Ever since then the vested interests, to wit the Royal Army Ordnance Corps (R.A.O.C.), the Royal Army Service Corps (R.A.S.C.), the Royal Engineers, and the Royal Tank Corps, have fought in and out of season on committee after committee against what appeared to be the obvious common-sense solution to those who had the interests of the Army at heart. The claim of these several Arms and Services that they, and they only, could maintain and repair *their* vehicles has at last been overborne. Today the maintenance and repair of mechanical and electrical equipment of all natures for the whole Army is recognized as the work of one distinct Service. As a matter of fact the Master-General of the Ordnance in India, with whom the India Office very wisely refused to dispense, in the person of General Sir C. Armitage, had already carried out a similar reorganization in India in 1938. As has happened before, the Indian Army was thus a year or so ahead of the Army at home. Despite the gloomiest prophecies of friction if not disaster, it was found in India

that the mechanical experts of even such old antagonists as the R.A.O.C. and the R.A.S.C. could combine harmoniously and happily and work as one Corps. To many this reorganization may not yet go far enough or be a sufficiently radical reform. There are those who call for a unified—and qualified—technical control of *all* engineering matters from specification and design to maintenance and repair. But the reorganization and readjustment entailed by even the present step is considerable: so perhaps it may be wise to hasten slowly. And so, in the midst of this desperate and mainly mechanical struggle for existence, the vast reorganization entailed by the formation of the new corps is taking place. It is a comfort to think that many expert Mechanical Engineer Officers will at last come rightly into their own. For years they suffered at the hands of the more senior members of the R.A.O.C. and R.A.S.C., who were themselves naturally without much technical knowledge or practical experience of mechanical engineering and of the vast and increasing problems bound up with the internal combustion engine.

Employment of Armored Infantry of an Armored Division

COLONEL WILLIAM L. ROBERTS, *Infantry*
Instructor, Command and General Staff School

It is becoming more apparent to those who employ armored units in battle that a sturdy member of the Division and tops in importance is the Armored Infantry. Its role in battle is increasingly becoming more important.

Far from being the general roustabout of the division for all common jobs of infantry, its special training to operate with and protect tanks in battle puts it also in the special class. Tanks, if properly employed will seldom enter battle without the protection of accompanying Armored Infantry. If Armored Infantry is not available, battle-wise tankers will try to find Motorized or foot infantry. Note the Russian method of getting their infantry up with tanks—they ride atop the tanks. There are the famous "Desanti" (a tank landing party. Ed). I do not believe we should discard this idea even if our Armored Infantry does ride forward in half tracks. No good idea should go untried.

Some ask the question, why should the infantry be so close to the tanks in battle—all that is necessary is that they occupy the ground taken by the tanks. That is the common misconception. In World War I and possibly early in World War II that would work in most cases.

The tank no matter how heavily armored and gunned is a prey for everything and every man on the battlefield. New devices are appearing constantly, new methods and bigger and stronger AT guns are being brought forth to kill the tank. The short ranged grenade, the A-T rocket, mines, the short ranged 20-mm, the 37-mm, the 40-mm gun all operate effectively only at ranges under 600 yards.

When the tank approaches defenses it buttons up and then its vision is constricted; it can't find every weapon operating against it, so it needs protection and that protection is furnished by the Tank's best friend—the trouble shooting Infantry.

In the bitter battles of North Africa did the English learn from the Germans how to stiffen the tank's action and lengthen their battle life by having specially trained infantry with the tanks.

Let us learn by the experience of our allies. They are trying hard to tell us that Tanks and Armored Infantry are nearly as inseparable as ham and eggs.

A Russian leader states that his veteran troops are rather undisturbed by having German tanks in the rear as long as the accompanying infantry has been stopped, because the tanks will have to return to replenish or if they bivouac alone behind the lines they are subject to night tank hunting.

Organization

So before proceeding much farther let us get an idea of the organization of the Armored Infantry Regt's. It has 3 Battalions, a Hqrs Co and a Serv Co. Each of its 3 Battalions have 3 rifle co's and a Hqrs Co. In addition there is a small battalion reconnaissance detachment, a very handy and useful unit.

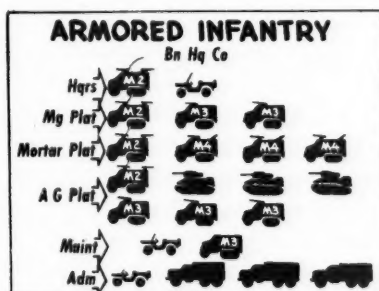


PLATE 1.

The rifle company has 3 platoons; each of these consists of 5 half-tracks.

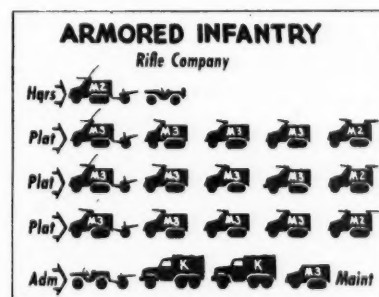


PLATE 2.

The Regtl Hqrs Co has as a tactical unit a platoon of reconnaissance consisting of 2 sections similar to battalions. Besides these companies is a Regtl Maintenance Company with normal duties.

Further information on this topic may be obtained from current T/O's and TBA.

The impressive part to note is that there are more weapons than men and that the vehicles are better vehicles than World War I tanks.

Reconnaissance

A moment with the reconnaissance elements of the regiment.

Each battalion Hqrs has a reconnaissance unit consisting of 2 motorcycles, 4 peeps and one half-track. Regtl. Hqrs has a platoon twice the size of battalion Hqrs.

These are similar to the reconnaissance elements in armored regiments and battalions and serve a useful purpose. In addition to training in reconnaissance work they should be trained to do special scouting and raid work.

Characteristics

The Armored Infantry Regiment is quite unlike foot infantry. Its name is almost a misnomer. It could be called plenty of other names than infantry. It is endowed with characteristics not only of Infantry but of Artillery, Cavalry and Tanks.

For instance, as Cavalry it is habitually mounted and moves to and onto the battle field entirely mounted. Like Cavalry it dismounts to fight on foot on occasion. Its weapons are quite similar. However, unlike Cavalry its led horses pack a strong firepower punch.

It resembles artillery in that it has self propelled 75's, 37-mm Antitank cannon and Mortars of 60 to 81-mm variety.

All artillery pieces so to speak.

In its resemblance to Tank units, quite frequently some of its 200 plus half-tracks will operate against enemy elements while the infantry is still mounted.

With those general characteristics in mind does not this suggest training leads and employment methods? More about training later.

World War I

One of the few lessons which came out of World War I's employment of the old slow tanks was that the tanks demanded Infantry support to the fullest extent and in addition they always wanted fresh and good infantry to accompany them,

The infantry support which tanks demanded and wanted then was firepower

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of small arms to keep down the fire directed at the tanks, not only from field guns moved forward in an antitank role but to keep down small arms fire directed at tanks.

Further they wanted infantry to keep close by and hold what they (the tanks) had already captured.

It was not hard in those days for foot infantry to keep up with tanks as the maximum speed of the World War I tank was 6 mph and they operated at two or three mph on the battlefield.

Now we hear of the necessity of close support of tanks by infantry in the present conflict.

Why should this be necessary? The tank is well armored, it's armament is adequate.

The reason is that as the war has progressed the means to counter tanks has been increased almost to a stopping point; that missiles directed at tanks in action kept them "buttoned up." When buttoned up their vision is heavily restricted and they cannot direct their power at everything.

So many of the newer antitank weapons are short range and are manned by front line troops: viz., rifle grenades, Molotov Cocktails, pole charges, ST grenades and rockets. These and the numerous infantry weapons are actively trying to find some way of stopping tanks. Full vision is needed and quick acting small arms fire is usually enough to keep this down. So we see a demand again for infantry to be near tanks to make the tanks more efficient—that is, by prolonging their battle life. So in order to accompany the faster moving tank of today the infantry is placed in an armored half-track. Not only that, this half-track is equipped with machine guns, mortars, and 37-mm guns. Good infantry will prove its worth many times over. As our tankers realize its value they will demand that it accompany them oftener.

In World War I the foot infantry could keep up with the tank. Now the infantryman must be mounted to keep up. The half-track is armored and protects against small arms. The Armored Infantryman attempts to remain mounted as long as possible. Until missiles larger than 30 caliber start falling near by, the armored Infantryman remains with his vehicle.

In dismounting, the steel vehicle should be used as a shield if necessary.

The gunner never dismounts unless the machine is dismounted.

After dismounting the vehicles assume habitually a position in defilade where their automatic weapons still may render powerful fire support. They keep near by unless the situation indicates they should withdraw.

Armored Infantry Not Supporting Tanks

Now let us see how Armored Infantry will operate when tanks are not present.

The principles and methods of foot infantry apply equally to Armored Infantry in combat; however, due to differences in weapons and mobility certain methods will logically differ.

The Armored Infantry Platoon has its 5 squads, all mounted in half-tracks.

Platoon In Attack

The illustration in Plate Three shows an armored infantry platoon in the attack when the squads are dismounted. In the rear of the rifle squads are three men each, they belong to the MG squad

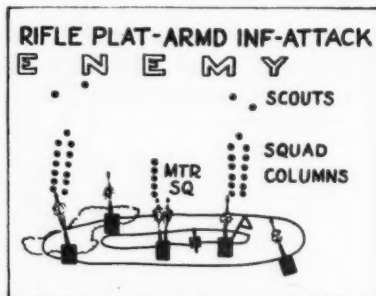


PLATE 3.

and each trio has the LMG. The 37 is covering the attack by fire—along side the vehicles whose weapons are manned by the gunners and drivers.

Flank protection or connection is handled by two or three men from the half-track of the platoon leader.

The assistant platoon leader usually commands the vehicular base of fire while the platoon leader commands the foot groups.

Overhead fire is shown in this illustration. The vehicles under the assistant leader will follow by bounds when the situation warrants it and set up a new base of fire to assist in the next advance.

Control of vehicles, besides the several dismounted groups is the platoon leader's duty. The platoon leader is in radio touch with the company commander. Some weapons from Bn Hq Co may assist but these are not shown.

A variation of the method shown in the preceding illustration. Not too frequently will a platoon have such a con-

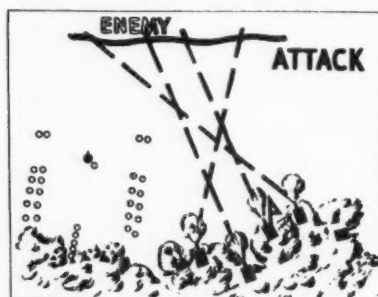


PLATE 4.

venient hill for its vehicular base of fire. In such a case then the vehicles may support by fire from a flank.

Smoke should be used quite as frequently as fire for covering advancing troops.

Platoon In Attack—Mounted

It is believed that only too frequently will the platoon—or a group of half-tracks—attack while the crews are still

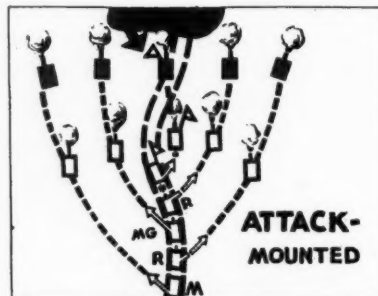


PLATE 5.

mounted. I do not believe we can help ourselves. If such is the case then preparation in the way of training should be instituted—and early, too.

These vehicles are as efficient as World War I tanks, more so in fact. They have guns, slightly thinner armor which will shed the small stuff, but fine cross country mobility.

Here we see the platoon initially moving along the road, then is fired on, upon which the platoon starts to spread out into a rough wedge formation—as it approaches the enemy, its weapons open fire and the platoon may approach a line formation as it strikes.

These first encounters should rarely include antitank guns. If that becomes the practice—dismounted action is recommended.

This brings up another small phase of training quickly picked up by the platoon, namely training to act as tanks. A half a day is sufficient to give a platoon training in "Column" "Line" and "Wedge" signals and movement practice, followed by a short discourse on tank methods of acting in platoon groups, control and other signals.

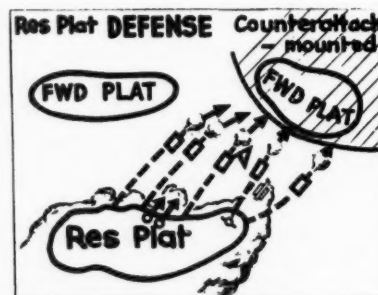


PLATE 6.

Herewith a part of a letter just received from a friend just back from Africa. "On one occasion the 1st Bn Steenth Armored Inf used some of their half-

EMPLOYMENT OF ARMORED INFANTRY OF AN ARMORED DIVISION

tracks in counterattacks as TANKS and destroyed a German company which had broken through a front line company. The Lieut took only the driver and a gunner in each vehicle. The Germans had no AT weapons and came out with their hands up. He not only did that but he took his objective and by placing his half-tracks in defilade held on for several hours until relieved.

"Another battalion however had disastrous results. The Bn Co did not consider mud in his rear and when forced to withdraw lost most of his vehicles. He was relieved."

Counterattack

This illustrates a company in defense with its right forward platoon driven out by the enemy. An immediate counterattack is launched by the reserve platoon. In this plate the method indicated is with the personnel all mounted.

The mortar, MG's and 37 might remain and furnish fire support; however, with Artillery or heavier weapons supporting from elsewhere this would be unnecessary.

It must also be visualized that other vehicles of Bn Hqrs Co and their weapons (mortars, assault guns, machine guns and just plain half-tracks of any variety) would be present or nearby.



PLATE 7.

They too would probably join the counterattack or support by fire. To expect green soldiers to do this well the first time indicates lack of experience. To do this correctly and automatically (as battle requires) requires intelligent practice under trained supervisors.

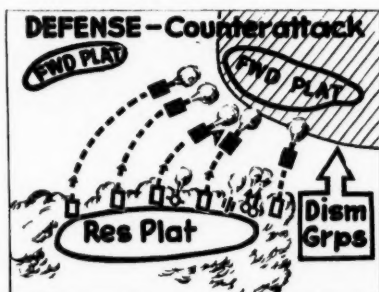


PLATE 8.

A variation from the preceding in which the dismounted platoon counter-

attacks while being supported by the platoon weapons and vehicular fire.

Still another method in which the vehicles move and the dismounted group attacks from another direction. The 3 battalion weapons could furnish fire from ground positions at the same time. The driver and a gunner for each weapon only move in the vehicles.



PLATE 9.

Attack of Antitank Guns

This is the mission for de luxe armored Infantry and they must know how to handle the situation automatically, expeditiously and grimly.

This should be automatically carried out. Orders of the leader of a properly trained platoon can be as simple as "3 vehicles" and a wave of the arm.

Antitank guns will usually be in pairs or in greater numbers with some protection so they must be approached cautiously. Armored half-tracks are prey for them as well as tanks.

While the encircling group is moving, the holding group can keep them fairly well neutralized by fire and smoke. It may be well to remember that the crews have only partial armor protection from the front and that machine gun fire will eventually find a mark through the sight and tube hole of the gun's armor.

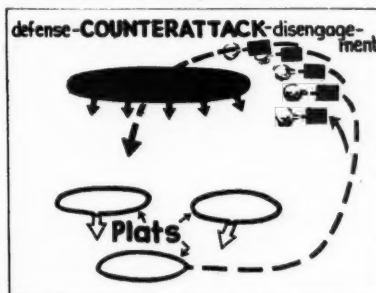


PLATE 10.

Counterattack to Disengage

This plate illustrates a common method of counterattacking a superior enemy in order to disengage hard pressed front line troops. A combination of counterattack used with smoke to screen the withdrawing personnel is recommended.

Perfect timing is important in this operation. The withdrawal of armored vehicles from combat is simple and less costly than the withdrawal of foot elements.

Defense

Defensively, with vehicles present, the platoon may be deployed as shown.

When vehicles are not present some of the vehicular weapons may be dismounted. This means training of many men as machine gunners. The defense



PLATE 11.

then will consist of several machine guns with such remaining men used as protectors of these.

A stronger defense results when vehicles are present but while this is desirable it is infrequent. Vehicles may be kept near by in the rear, to cover the withdrawal and to pick up the crews.

Platoon-Defense Wide Front

Quite often does armored Infantry have to make itself appear larger than

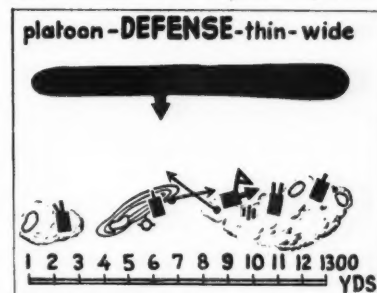


PLATE 12.

it is and cover a wide front.

Here it is shown paper thin, no depth on a front of 1400 yards. It has MG's, a mortar and a 37-mm gun and may have attachments from Bn Hqrs Co. It may not hold long in the position shown. This requires practice and good communication in a platoon finely trained. (Ovals represent half squads.)

Platoon On Outpost

Quite frequently the platoon will be

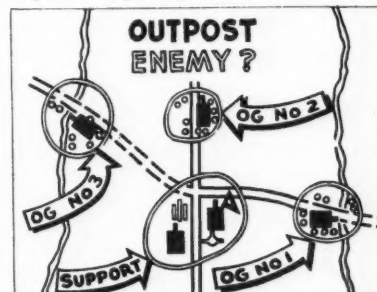


PLATE 13.

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found on outpost duty. A method of using the unreinforced platoon is illustrated herewith. Reinforcing by means of weapons from the Bn Hqrs Co is frequent, depending on conditions. In this situation we see the support and its three outguards (OG).

Allotment

Seldom will the Regiment act alone. These exceptions are in attack against tank proof ground when other infantry is not available, defense, river crossings and possibly some other special cases.

The regiment is capable of breaking down into small parts and is trained to accept this as normal. Frequently though the Battalion will be together in a Combat Command or Task Force.

Companies will frequently be detached to operate alone or with other units. In these cases it is right that their fair proportion of weapons from Bn Hqrs Co be attached to them where necessary. It is usual to find one infantry battalion with each combat command and one in division reserve, always in teams of other forces.

This is convenient allotment and it implies that that is a correct allotment. It means that one infantry battalion will support 2 or 3 tank battalions; a further break down will give one reinforced rifle company to operate with a tank battalion. It may be a correct and true allotment but I believe that a truer allotment which will give economy of force is an infantry battalion to a tank battalion—or an infantry company per tank company.

I believe that the addition of infantry to tanks, closely operating with them in offensive operations will save tanks and prolong the battle life of the tanks and therefore of the whole division.

A casual study of recent Armored Campaigns indicates that most of them develop into battles of attrition. The side which, by any means, can maintain a longer battle life soon ends up the pursuer.

At present under the present tables of organization, it is felt that training must include the operation of a company of infantry with a battalion of tanks. Even this allotment will considerably strengthen the team.

Attack With Tanks

Armored Infantry with or without other light troops blankets the entry of tanks into battle—they prevent ambushed antitank guns from taking early toll of the tanks. When resistance stiffens the tanks pass through.

When tanks pass through the infantry may fight on the flanks, or among the tanks, or may follow up depending on terrain and other troops. Here we see the stiffening given tanks by the halftracked doughboys.

The Germans and Russians have good reason for trying to separate tanks from their supporting infantry.

These infantrymen of armored divisions are rightfully called "trouble shooters" for tanks.

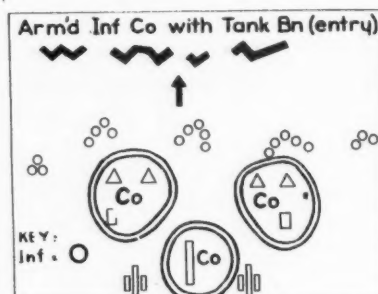


PLATE 14.

After an attack or even during an attack it may become necessary for the infantry to take over the front while the tanks withdraw to replenish or for other purposes.

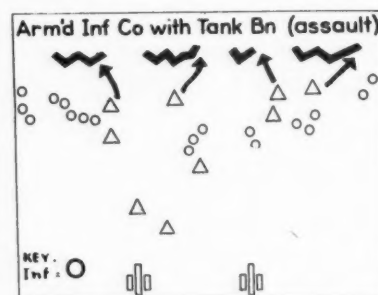


PLATE 15.

This they may do if plentifully supplied with antitank guns as are the European armies. The AT guns of an Arm'd Inf Regiment are not yet sufficiently potent or thick enough to make a hedge of defense sufficient to stop modern armor.

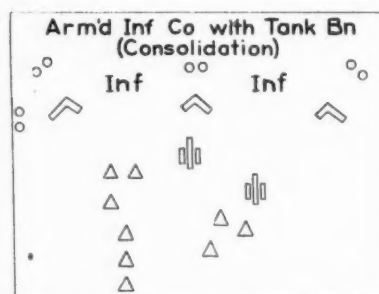


PLATE 16.

The Motorized Infantry of Rommel was usually so well padded with 88's and 50's that British Armored units had little chance to beat it down. It appears that the tendency in North Africa was to make the Armored infantry so strong in antitank weapons that they could act as a solid-pivot around which tank units

could operate and to make them so strong with anti-air weapons that aircraft attacked only from great heights.

Role

The following is in general a list of the roles which the Armored Infantry of a Division may expect to play from time to time:

- To be a part of a team and accompany tanks in battle.
- To precede tanks in battle and serve as preparers for the tank blow.
- To follow a tank blow to crush any resistance which remains.
- To hold ground already gained by tanks.
- To attack when the terrain is unsuitable for tank operations.
- To attack a position which contains massed AT defenses when it would be too costly for tanks.
- To assist in protecting bivouacs, assembly areas, or rallying points.
- To act alone or in conjunction with other arms in all security forces (advance, flank, rear guards, outpost, day or night).
- To force river crossings.
- To establish bridgeheads or beach-heads.
- To establish or reduce road blocks.
- To occupy, organize and defend defensive positions.
- To assist in laying or removal of mine fields or obstacles.
- To conduct reconnaissance or counterreconnaissance missions.
- To furnish anti-aircraft defense.
- To furnish Antitank defense.

Training of Armored Infantry

1. Use of weapons to include known distance firing and combat practice.

Each officer and enlisted man of an Armored Infantry Regiment should at least be trained to operate the machine gun, the rifle and the submachine gun. In addition to this the bayonet and grenade must be a part of each individual's knowledge.

It will be found that training in weapons (including firing and combat practice) is never ending.

Several understudies should be trained for each machine gun, mortar, 37 and assault gun. This too is a large order.

2. Conditioning and Hardening.

This is a necessity but should not be carried to extremes with frequent peaks particularly when active service is not close and when other techniques are neglected. Obstacles and bayonet courses are good close-in conditioners. Medium and long marches appear frequently on good regimental training schedules.

EMPLOYMENT OF ARMORED INFANTRY OF AN ARMORED DIVISION

3. Drivers and Mechanics.

Each of the 400 odd vehicles needs properly trained drivers. Assistants also must be provided. This too becomes a task of an organized school system to provide companies with sufficient mechanics, drivers and assistants.

These classes of instruction must be repeated until all needs are filled.

4. Specialists.

Organized classes with a maximum of practical work in all types of specialists are a necessity. These special classes are communication, mortar, assault gun, 37-mm gun, machine gun, submachine gun, carbine, pistol, clerical, etc.

A class for first sergeants, supply, mess, and communication sergeants has been found of value.

5. Officers.

These should be able to fire all weapons and drive all vehicles of the regiment basically.

Officers schools at least thrice weekly on tactical handling of small units is almost mandatory.

6. NCO Schools.

It has been found that if these schools keep up with current training in preparation for the next day's work that considerable will be accomplished. In addition tactical small unit problems presented at officer schools should be re-presented to NCO schools by organization officers.

7. Walk Through Set Problems.

A series of problems, from 10 to 20, can be prepared for organizations from a squad to a battalion and a few special problems for groups such as reconnaissance elements, communication elements weapons groups, etc. Each organization

from the squad up completes these problems. For instance a few problems are named:

- a. Day Patrol of squad, foot—about 4 miles going and coming.
- b. Night Patrol of squad, foot—shorter than a.
- c. Motor Patrol—10 miles—day.
- d. Motor Patrol—10 miles—night.
- e. Azimuth practice—marching with compass.
- f. Platoon unreinforced—attack.
- g. Platoon reinforced—attack.
- h. Platoon road block.
- i. Patrol defense, normal.
- j. Patrol defense, wide front.
- k. Platoon outpost, day and night.
- l. Platoon infiltration, day and night.
- m. Company, attack 3 to 4 miles, varying.
- n. Company, defense, counterattack.
- o. Company, Delaying action, with and without smoke.

8. Training with other troops.

Training with tanks in small groups should start early and progress to task forces built of all arms around a tank battalion.

Demolitions, mine planting and removal is part of the Engineer techniques needed.

The Company or Battalion on reconnaissance missions on broad fronts should be practiced.

9. Tactical problems involving all types of combat and missions should be prepared for units up to the battalion.

Conclusions

Armored infantry is a specialized group whose importance in armored Divisions is just being realized. Its training task is immense, much more complex than that of the tank units or even engineers.

From the list of tasks which may be assigned to this unit it is evident that unless some steady balance wheel is present in the Division Operation Center this regiment will seldom have time for sleep. No one can fight or march all day then take over the outpost by night.

Those who control the operations should forever be concerned with having these stiffeners with tanks when they enter combat.

These Armored Inf "stiffeners" are specialists at protecting and operating with tanks. They are organized and equipped for that purpose. Therefore wastage of them on chickenfeed details must be avoided. Their use in attacks away from tanks must be avoided also, particularly when motorized or foot infantry can be found for the job.

Going a little higher in the scale we find Gen. Montgomery at El Agheila sending back for foot infantry for attacking Rommel rather than waste the motorized New Zealanders which he wanted for more specialized use later.

We have passed the war hour when a gang of bully tanks could have their own way anywhere—they need others with them now who carry different clubs and use them in a different way; and one sturdy member of these is Armored Infantry.

The German sees the solution of his tactical problem in the attack, for it is through the attack that the unclarified situation can best be clarified and a basis reached upon which the commander can best estimate his future action. It may be said almost without danger of contradiction that in a nebulous situation the average German commander will attack. And it is from such an attack or such attacks, that hostile weaknesses are exhibited which the commander can capitalize and exploit.

—Captain H. A. Hartness, U. S. Army, in *German General Staff School, Staff Methods and Tactical Doctrine*.

The Staff College, Camberley

MAJOR A. J. C. PRICKETT, *The Royal Norfolk Regiment*
British Army Staff, Washington, D.C.

The Staff College, Camberley, is organized in three Wings: Senior, Intermediate and Junior. The Commandant is a Major-General, who commands the whole College. Each Wing is designed to train a different grade of Staff Officer and is in charge of an Assistant Commandant, with the rank of Brigadier. Only one of each type of course is run at a time.

Students are selected from all parts of the United Kingdom, Gibraltar, West Africa and the British West Indies. They include in their numbers officers from the British Dominions serving in Great Britain.

No attempt is made to produce Commanders, although the aspect of command is considered, insofar as it affects the functions of the Staff. During indoor and outdoor tactical and administrative exercises, certain students are detailed to represent Divisional or Brigade Commanders. The problem is presented to them and they are required to make a command decision. The remaining students form the Staff and each is assigned an appointment, and functions so as to put into effect the orders of the student representing the Commander.

An essential part of the training in all three establishments is to make officers accustomed to working as a team.

The Senior Wing of the Staff College at Minley Manor, some four miles from Camberley, exists for the purpose of training officers for senior staff appointments of Lieutenant-Colonel (first grade), Colonel and Brigadier. Officers are selected mainly from those who have commanded units and who have had previous staff experience in a lower grade. The Course caters for about 60 students and is sixteen weeks in duration. The curriculum includes all phases of higher staff work up to and including Army Staff problems. Lectures are restricted to an essential minimum and the bulk of the work is done in syndicates of eight or nine officers.

The Intermediate Wing of the Staff College is situated in the College Buildings at Camberley, but one-third of the students are housed in the Royal Military College (Sandhurst) buildings about a mile distant.

The Course caters for two hundred officers and lasts for sixteen weeks. Officers selected to attend this Course must be between twenty-five and thirty-five years of age, and have had at least one month's staff experience and possess a sound knowledge of their own arm of the Service. No specification is made as to rank, which may be between Lieutenant and Major; a few Lieutenant-Colonels have attended these courses. A number of vacancies are allotted to United States forces serving in the United Kingdom and Polish and Belgian forces receive a small quota.

The object of this course is to train officers for Second Grade (Major) Staff appointments, primarily in field formations. These appointments may be either G(G-2 and G-3), A(G-1) or Q(G-4) Branches of the Staff.

The Intermediate Staff Course is divided into three Divisions of approximately equal strength; each has a Lieutenant-Colonel in charge. Divisions are subdivided into syndicates, each of ten students under an Instructor. Students change their syndicates three times during each course, when new syndicates are formed. This has the effect of making the student work with different personalities and also every officer is reported on by three different Instructors, in addition to the officer in charge of the Division.

Instruction is based on the divisional level and below. Higher formations are only considered insofar as they have a direct bearing on the instruction and the problem on hand.

Much work is done in syndicates in the form of informal discussion. A Student Officer almost always presides at these. The instructor is present to ensure that the discussion proceeds on the right lines and that all aspects of the question are covered.

Each phase of War is considered from the point of view of all arms. Indoor syndicate discussion and a cloth model exercise, attended by the whole Wing, precede an outdoor tactical exercise without troops. Great emphasis is laid on the administrative aspect in all problems.

Instruction includes the preparation, writing and issue of orders, appreciations (estimates), staff duties, movement by road, military writing, battle procedure (deployment drill), air co-operation and administrative duties. The relationship between the staff and the subordinate units and formations and the services is strongly emphasized. Combined operations (Amphibious Warfare) is also included in the curriculum.

The Junior Wing is accommodated in part of the buildings formerly housing the Royal Military College.

The Course caters for about 100 officers and its purpose is to train Second and Third Grade (Major and Captain) Staff Officers for appointments at headquarters other than field formations. Officers nominated to attend must be between 35 and 41 years of age, unless they are unfit for active service, in which case younger officers are admitted.

The Course is twelve weeks in duration and is an abbreviated form of the Intermediate Course, a certain amount of detailed work covering field formations being omitted.

The Development of Combat Intelligence

LIEUTENANT COLONEL JAMES F. HOWELL, *Coast Artillery Corps*
Instructor, Command and General Staff School

The Japanese have a very low estimate of the effectiveness of combat intelligence as practiced by the American Army. An excerpt from a Japanese training manual appeared recently in *Intelligence Bulletin*, Number 5, MIS that is very much to the point. "The Americans are very poor at scouting, patrolling, and security measures; so the effects of a sudden attack and the benefits to be gained therefrom should always be kept in mind." Since the Japanese have an excellent system in operation for the gathering of military intelligence, built up over a period of years, tested and proved effective by their successful campaigns in the Philippines, Malaya, Dutch Guinea, and Burma, there is probably a great deal of truth contained in the excerpt. For those, who do not place credence in Japanese sources, the same story is told, in slightly different language, in any critique published in 1942 on any maneuver involving forces as large as a division.

Since this condition existed on December 7, 1941, and exists in the majority of units now in training in the United States there must be a cause and a remedy.

THE CAUSE

The cause is a natural one. In peace time there was no enemy, he was either assumed or outlined by friendly troops. Commanders were interested in operations because they could see results; the mistakes of a faulty decision based on inadequate information of the enemy or the terrain were not readily apparent nor were they penalized as they would be in war. There thus grew up a feeling in the "line" that military intelligence sections were not very important anyway. Commanders, as a rule, picked their best subordinates as operations officers, their next best as supply officers and so on down the line. When they reached a low order of priority, they picked a G-2 or an S-2, let him function during maneuvers, and used him as a public relations officer and odd job man around the headquarters. Military intelligence thus fell in low esteem and training of intelligence sections was neglected. Then came the war and the need for adequately trained intelligence sections slowly became apparent.

THE REMEDY

The remedy is simple, commanders of all units from the Army down to the platoon must be made to realize that the production of combat intelligence is a function of command. The commander, alone, is responsible for what their unit does or fails to do. It is their function to train their own units in combat

intelligence. It is their function to direct the search for information and give due consideration to the evaluated information so collected before arriving at a decision. Any other course of action will lead to disaster as it affects a commander's career, or of more importance, the lives of the men under his command. Pearl Harbor is an outstanding example of the results caused by the failure of commanders to realize their responsibilities in this manner.

PURPOSE

The purpose of this article is to show how the system, used by the American Army in the development of combat intelligence, functions. The term, combat intelligence, may be defined as that evaluated information produced in the field by the troops engaged.

FUNDAMENTALS

In approaching the subject, there are two fundamentals that must be thoroughly understood.

In the first place, the primary objective of military intelligence is to assist the force commander in arriving at a decision concerning the conduct of an operation by dissipating the fog that surrounds such details of the enemy's situation as strength, composition, dispositions, and combat efficiency of his forces and the nature of the terrain under his control. The scope of these investigative efforts is restricted, in that they are supplied only to those enemy forces capable of interfering with the execution of the mission and to that terrain over which the operations will be conducted. In order to illustrate the truth of these statements, consider the situation that existed on the front of the British Eighth Army in December 1942. Rommel's African Corps was approaching the last good defensive position to the east of Tripoli, the Wadi Zem Zem. General Montgomery's Army was in hot pursuit. Two practicable enemy lines of action were open to General Rommel; he could either defend the Wadi in force or he could continue his delaying action by holding the Wadi lightly while the bulk of his force moved on Tunisia. Was early information as to which line of action the enemy would adopt of value to General Montgomery? Was his decision as to employment of the British Army to be influenced by the line of action Rommel adopted? The answer is in the affirmative to both questions. If the enemy held lightly, the British could continue the pursuit; if they held in force, the British must pause until reinforcements could be brought up from the rear and reorganized for an attack. If Montgomery did not receive the correct information before his main ele-

ments reached the line, he ran the chance either of running into strong resistance in an improper formation and incurring unnecessary losses or halting unnecessarily before a weak line thus losing precious time that the enemy could use to good advantage. It should be apparent that the decision in this specific situation would be based primarily on information of the enemy.

In the second place, because of its importance, it is the responsibility of every unit commander to direct the unremitting search for information. The intelligence section of a unit, and one exists in every unit the size of a battalion or larger, is the agency used for planning the collection of information, presenting the evaluated result to the commander and disseminating it to other interested individuals who need it.

With these points in mind, it is clear that the intelligence officer has a practical job to perform just as any other officer on a commander's staff. He is given a task by the commander. The results expected are: prompt dissemination of evaluated information, the outline of the enemy situation, salient aspects of the terrain and the weather as they affect operations, and conclusions drawn from the above as to those lines of action the enemy is capable of adopting. This result is not complete within itself, it is merely one of several factors that the commander must weigh in arriving at a decision as to the line of action to be adopted.

SEVEN STEPS

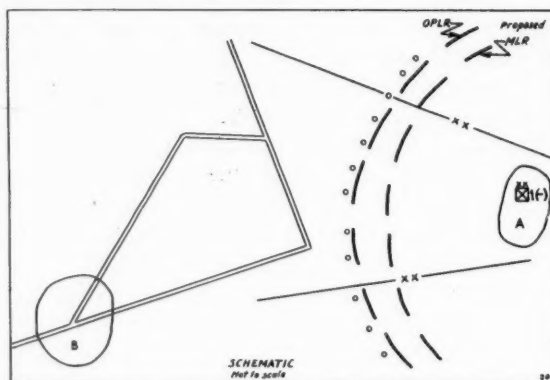
Since the problem is practical there must be a workable system to obtain results. The one explained below is based on FM 30-5 (Combat Intelligence). If followed, it will produce results. The Field Manual indicates that the Intelligence Officer must follow a logical method of reasoning in arriving at conclusions. This thought process can be broken down into seven consecutive steps as follows:

1. The determination of the "Enemy Capabilities" based on the last known facts concerning the enemy situation.
2. The "Essential Elements of Information" as announced by the commander.
3. The analysis of the "Essential Elements of Information" for detailed "Indications" which will answer or tend to answer the essential element under consideration.
4. Formulation of "The G-2 Plan" to collect information of these indications.
5. Orders and requests to intelligence agencies to obtain certain definite information.
6. Collation, evaluation and interpretation of information.
7. A new estimate of "Enemy Capabilities."

This is a continuous process. It will be noted from the above that the steps form one cycle. Starting with a list of "Enemy Capabilities" based on certain

facts, G-2 derives, at the completion of a cycle, a new group of facts necessitating a new estimate of the "Enemy Capabilities." The Capabilities are the starting point of another cycle. While not included in the steps, important evaluated information is disseminated by the fastest available means to the individuals concerned.

By means of a simple situation, let us follow G-2 as he applies these steps.



SKETCH 1.

SITUATION:

Enemy: Cavalry forces in contact with outpost line of resistance

One infantry division located Area B

No movement from area noted up to 0600 May 23.

Own Troops: 1st Infantry Division, less 2 battalions reinforced in bivouac Area A

2 battalions reinforced on outpost line of resistance

Mission: 1st Infantry Division to occupy and organize battle position as shown on Sketch 1. Movement to commence 0700 May 23

Time Now: 0530 May 23

Requirement: Estimate of enemy capabilities to interfere with the movement to the defensive position and its occupation and organization.

CAPABILITIES

In arriving at his estimate of capabilities G-2 must first analyze the mission with respect to the time and terrain; in other words, he must know where our troops will be located and what they will be doing. He would, no doubt, confer with G-3 who might inform him that our troops would move out at 0700 May 23, arrive on the position at 1300 May 23, and complete a hasty position defense by 1900 May 23. This information is necessary, as G-2 cannot consider enemy capabilities intelligently unless he is thoroughly conversant with our own plans.

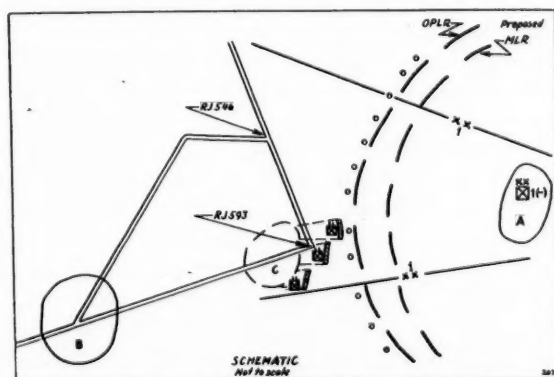
Knowing that the tactical operation will not be completed until 1900, G-2 sets his time period for considering enemy capabilities to include that time (1900). Note that unless the time period for considering enemy capabilities is limited, the number of capa-

bilities is infinite. For example, an infantry division moving on foot cannot march 100 miles and attack the same day. Such a line of action would therefore not be a capability. If the time period considered was three days, however, it would be a definite capability.

G-2 is now ready to consider enemy capabilities under the general heading of: "Attack," "Defend" and "Withdrawal." If adoption of any of these lines of action by the enemy will not interfere with the accomplishment of the mission, they should be discarded. In our problem, if the enemy withdraws or defends without first launching an attack on the front held by our covering force, he will not interfere with the accomplishment of our mission. Capabilities of defense or retrograde movement are therefore immediately discarded, leaving us with only one general line of action "Attack."

Now comes the first point where difficulty is experienced. The statement of a capability, that the enemy can attack, is of little value to the commander, a glance at the map will tell him as much. What he desires to know is: **How** can the enemy attack (piecemeal, coordinated?) **Where** can the enemy attack (frontally or on the flank?) **When** can the enemy attack? And finally, **in what strength?** A good G-2 must be able to supply these details. To obtain them, G-2 projects the enemy forces forward into positions from which they can initiate each of the several attacks under consideration, visualizes the movements the enemy must take in order to arrive in these positions, and then he computes the time and space factors involved. His starting point, as to time, is that hour the enemy was last fixed in a definite locality.

Going back to our problem, the first type attack the enemy can launch is from the air, since this is an ever present threat nothing is accomplished by mentioning the capability to the commander. If competent, he has already taken proper measures to protect his column from air attack.

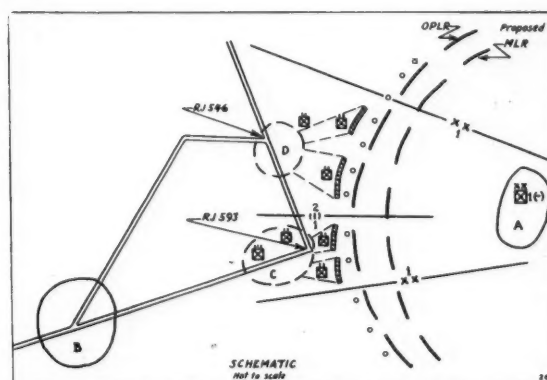


SKETCH 2.

The next type attack from a standpoint of time, could be an attack launched directly from the de-trucking area by infantry moved forward in trucks. If such an attack against our covering force was successful, ground to the rear could be seized forcing the 1st Infantry Division to fight in order to reach the

position or compelling the commander to change his plans. Such action is therefore a definite capability. Still following our system, let us place one infantry regiment in attack formation as shown in Sketch 2. These positions were picked because they were closest to the outpost line and just out of range from observed fire from infantry weapons. Next, visualize the enemy moving forward in trucks to Area C, de-trucking, receiving their final orders, moving out to their attack positions and attacking. G-2 must now compute the time involved. For Purposes of illustration, use 25 mph for motor movement on roads, 1.5 mph for movement across country. In combat, use as a basis for computation those rates the enemy has been known to maintain. For example, the Japanese in Malaya are known to have maintained a rate of march of over 3 miles per hour on jungle trails. The problem is solved as follows: Movement on roads,—20 miles at 25 mph,—48 minutes; for last truck containing personnel to arrive in area,—10 minutes; for orders and final reconnaissance,—30 minutes (arbitrary); 1 mile at 1.5 mph,—40 minutes. The sum total is 128 minutes or approximately two hours. Adding this figure to the last hour we fixed the enemy at Area B (0530) we get the figure 0730 as the earliest time an attack could be launched by a battalion from Area C. The capability might be stated as follows:

The enemy can attack piecemeal from Area C with one division, initiating the attack at 0730 with one battalion, provided movement is made by motor, 2 additional battalions can be committed shortly thereafter.



SKETCH 3.

Let us consider next a coordinated attack launched against our south flank. Here G-2 would project enemy regiments to positions as shown on Sketch 3: the 1st Regiment to attack positions on a rather narrow front; the 2d Regiment on a broader front on the north flank for the secondary effort; and the 3d Regiment to a position in reserve. The location for 1st Regiment should be such that a favorable avenue of approach can be utilized if possible. The selection of these areas are purely arbitrary. The method is justified because the enemy must occupy approximately the same positions as we have assumed in order to make an early attack from that area. This is the only

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method that will provide a basis for computing "Time and Space." G-2 should then compute the time necessary for two battalions of each regiment to arrive in position. Two battalions in the assault is a normal disposition for a regiment in the attack.

Using the same rates as before and basing our computations on the time it takes the north battalion of the north regiment to arrive in position (it has the longest route to travel and we can assume that the artillery can arrive in position while the infantry is moving across country and receiving its orders) we get the following results:

3 miles at 25 mph,—72 minutes; last truck containing infantry personnel to arrive in area,—20 minutes (considering all infantry personnel in trucks at head of column); orders and final reconnaissance,—30 minutes; 2 miles at 1.5 mph,—80 minutes; or a total of 3 hours and 22 minutes. Adding this figure to 0530 the sum is approximately 0900. Reflection will indicate that an attack with main effort from Area B could be launched at approximately the same time.

This capability might be stated as follows:

"The enemy can attack with one division making his main effort on our south flank from Area C or on the north flank from Area D by 0900 May 23 provided he moves his forces forward by motor."

These are the only capabilities that need be considered at this time. There are several salient points, however, that should be noted.

The elements: how, when, where, and in what strength are included in the statement of each capability.

G-2 has indicated the earliest time the enemy can initiate each attack.

Time calculations, for the conduct of the operations, are considered in the most favorable light from the enemy's point of view. For example, the enemy may have sufficient trucks to move forward by motor hence G-2 should consider this means of locomotion until he has good reason to believe that such transport is not available. To do otherwise is to neglect a definite capability. There would be no objection to adding a statement as to the time the attacks could be launched if movement was made on foot provided this time does not extend beyond the time period in which G-2 is now working (1900).

Most important of all, G-2 has stated that certain attacks can be initiated from specified areas at specified times; he has not said that these attacks would be launched. The latter statement would be conjecture. What G-2 has done, in substance, is to inform his commander of certain time and space factors pertaining to enemy actions that can be weighed against time and space factors pertaining to our own forces. The Commander may use this information to guard against surprise or possibly to reach a new decision.

One final point concerning enemy capabilities, do not confuse the method of capabilities with that of intentions. It has often been said that the results of the two methods are one and the same. Such is not

the case. The British use the method of intentions as did the American Army until a few years ago. We now use the method of capabilities. Avoid any tendency toward intentions and do not underestimate the enemy. To illustrate these two methods, consider the examples appearing below realizing that the Japs did come down the Malayan Peninsula.

FIRST

Commander: What about the Malayan Peninsula? Do you think they will come that way?

G-2: I don't think they will, the jungle, swamps, etc. . . . No, they won't come that way.

SECOND

Commander: What about the peninsula? Can they come that way?

G-2: I don't think they will, the jungle, etc.

Commander: I did not ask you that; I said can they?

G-2: Well, yes, they can, but—

Commander: No "buts", if they can, I'll take measures to safeguard against that threat.

ESSENTIAL ELEMENTS

Again returning to our method, the next step in the cycle is the consideration of "Essential Elements of Information." At any time during an operation there is certain vital information concerning the enemy, the terrain, and the weather that a commander must know in order to execute his mission successfully. When the commander expresses the need for this information in his directive to the staff, the information desired is called the "Essential Elements of Information." As this vital information will vary with each situation, "Essential Elements" cannot be stereotyped but must be based on the situation confronting the commander at a particular time. The announcement of the "Essential Elements of Information" is a command decision and when announced they should be considered as a directive to G-2 to use his agencies and other sources to get the desired information. They should not dissipate the efforts of the reconnaissance agencies by directing *all* information be secured. While this would be desirable it is rarely practicable; therefore the efforts of the agencies should be concentrated on the vital information. In some extreme cases, they may concern a single capability, adoption of which by the enemy might be particularly dangerous to our own forces. In most cases, answers to the "Essential Elements of Information" will show the particular capability the enemy is adopting. For example, in the illustrative problem, vital information needed by the commander, provided the enemy moves to the attack, would be where will the enemy concentrate the mass of his forces and whether additional troops will be brought into the area. This information is necessary so the commander can dispose his troops to meet the

THE DEVELOPMENT OF COMBAT INTELLIGENCE

mass of the enemy attack or formulate another plan of action.

Following out the idea that the "Essential Elements of Information" are a directive to G-2, they might be stated by the commander as follows:

"G-2, find out for me whether the enemy will concentrate his forces for an attack on our north or south flank. Let me know immediately of any other forces that can arrive in the area before we complete the occupation and organization of our defensive position."

The primary value of the Essential Elements of Information is that they provide G-2 with the guides necessary for the development of a plan for the systematic collection of information, called the G-2 Plan. This plan is prepared using the process of inductive logic, in other words, G-2 considers the final results and then visualizes the actions (indications) the enemy must adopt to achieve this result. This thought process is called the analysis of the "Essential Elements of Information" for indications, which if obtained, will answer or tend to answer the Essential element under consideration. Applying this principle to our problem, the commander desires information as to whether the enemy will concentrate his forces on the north or south flank. Following our process, let us assume a bivouac area for troops on the south flank and visualize the actions the enemy must take to arrive therein. These actions would involve among others, the formation of vehicle columns in Area B, movements on roads toward the assumed bivouac area either in motors or on foot, detrucking of troops in the new bivouac area, establishment of a counter-reconnaissance screen and increased activity in the area. True, other areas may be occupied but indications as to where the mass is being concentrated would be indicated by the comparative amount of activity toward or in the several areas. Similarly, indications that would answer or tend to answer the essential element concerning reinforcements would be the arrival in the area of additional troops by rail, truck, or by marching on foot. Conversely, if no troop movement is observed, although surveillance has been adequate, we have an indication that the enemy is not being reinforced. It is thus apparent that the information to be sought is concerned with specific indications. If sufficient positive, and in many cases negative, information can be obtained, the "Essential Elements of Information" can be answered and the enemy capabilities narrowed down.

FORMULATION OF THE PLAN

Knowing what detailed information is required, G-2 must now plan how he will collect it. He therefore considers the capabilities and limitations of the reconnaissance agencies available and tentatively assigns specific units to search for specific items of information concerning each indication. To extend his

search for information laterally and in depth he requests information from adjacent and higher units. He tries to foresee when the information will be needed by the commander and strives to have the latest information by that time. If the information is several hours old, it is possible G-2 will present a false picture, if the information is not received in time to use it is of no value.

ASSIGNMENT OF MISSIONS

After the plan has been completed and adjusted to obtain the information by the agencies or sources most capable of obtaining it, G-2 combines in one message to each agency all missions assigned to it. Each mission should be specific as to what is wanted, where the information is to be sought, when and where the information must be reported back to G-2. The "when" is necessary so that information will be reported back in time to be of value. "Where" is necessary in the event that the command post is moved. Provisions should be made, when necessary, for reports to be made to subordinate commanders. An example would be, to notify the commander of the covering force concerning the approach of enemy forces toward his position. These messages are prepared in the name of the commander, approved by the Chief of Staff and, follow the normal command channels except in urgent cases when the information can be transmitted directly to G-2. He should be careful not to tell the subordinate how to accomplish the mission. Care must be exercised in assigning missions to insure that sufficient time is allowed for the proper performance of the mission. A sample message to a reconnaissance agency follows:

Hq 1st Inf Div
Dodge City, Kansas
230200

CO Outpost 1st Inf Div

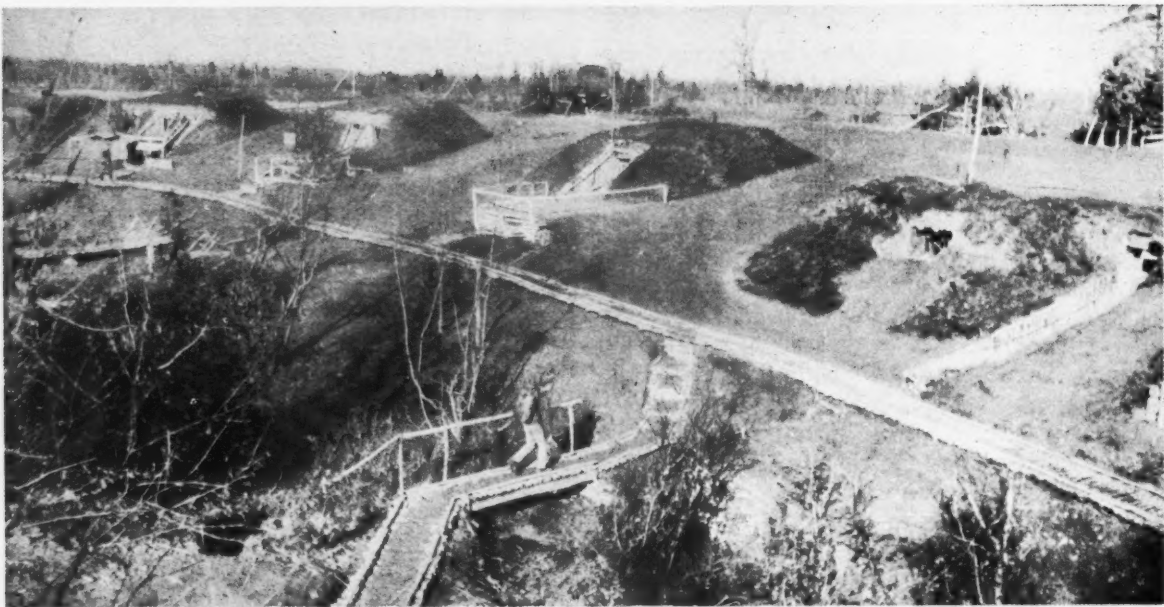
Keep under surveillance RJs 546 (414-735) and 593 (415-738). Report immediately to Adv Msg Cen length, direction, composition columns observed. Negative reports 231200 and 231800.

CG 1st Inf Div
Gay Dresser
Lt Col GSC—G-2

CONCLUSION

This method illustrates the line of reasoning followed by G-2. Realize that the above system may be modified in the field to meet fast moving situations by using abbreviated or mental plans. Realize also that as the situation develops, the plan must be constantly revised and new missions assigned. Remember that if G-2 is going to perform his duties in an efficient manner, he must have a plan for the collection of information and he must be able to assign intelligible reconnaissance missions to his agencies to secure specific information.

Underground Cities in Russia



German soldiers have constructed extensive "underground cities" in the swampy Russian plains close to the battle-front along the Volkhov river which runs from Lake Ilmen to Lake Ladoga south and east of Leningrad. Birch trees abound here and provide material not only for the buildings but for hundreds of miles of corduroy motor roads across the swamps.

Owing to the nature of the ground the huts must be constructed on slopes where good drainage is possible. Corduroy walks connecting the buildings are necessary because of the soft, slippery clay soil. It is evident that considerable care has been taken to make these dwellings as attractive as possible both inside and out.

Six or eight men occupy each hut and there are also underground stables and storage places for coal and supplies.

—From *Die Wehrmacht*.



Motor Movement by Organic Transportation in the Infantry Division

LIEUTENANT COLONEL G. O. N. LODOEN, *Infantry*
Instructor, Command and General Staff School

Modern warfare requires the rapid movement of all COMBAT power, that is troops, weapons, ammunition, rations. Units will be employed continuously either in fighting or moving. Off the battlefield movement will habitually be by motor, to rest the soldiers, conserve their strength, increase their morale.

How are we going to accomplish this in the Infantry Division which does not have sufficient organic transportation to move all its personnel, weapons, equipment, ammunition and supplies normally carried at one time like the Motorized or Armored divisions?

The answer to that is: by controlled echeloned displacement in time and space, all elements of well balanced fighting forces, including their reserves, additional ammunition, limited rations, are moved and operate within relative supporting distances.

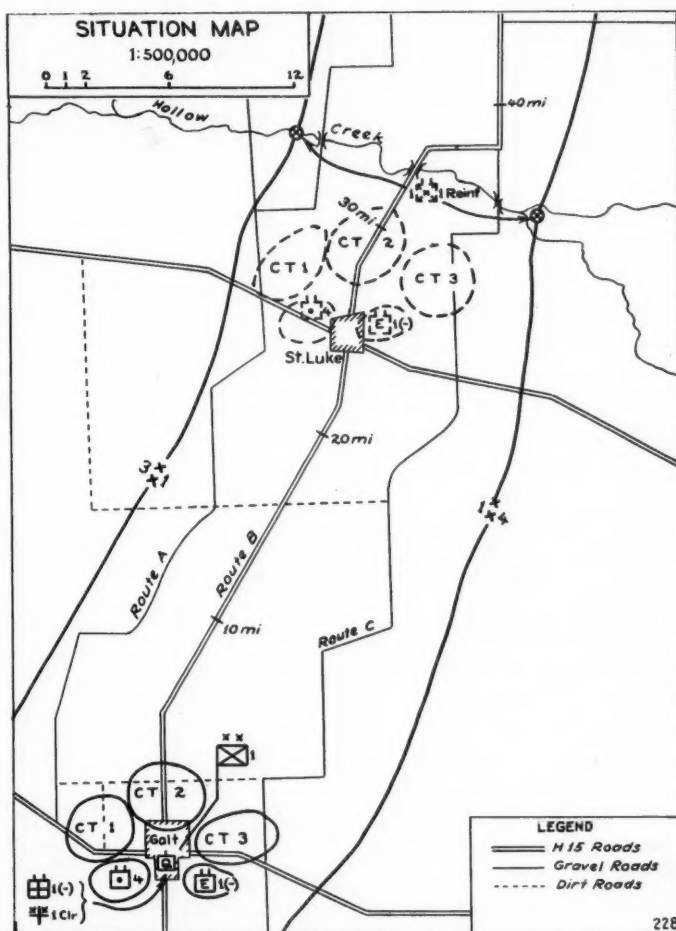
The Infantry Division can, for example, by pooling its transportation, move two Combat Teams with the necessary ammunition, rations, and equipment in one trip, and the remainder of the division in another trip. Such a movement is commonly called "shuttling." But let's avoid the use of the term shuttling and think of a movement by this method as a series or group of motor movements, each consisting of the movement of a well balanced fighting force such as a Combat Team, not just an Infantry Regiment or Battalion, but a force well balanced in troops, weapons, ammunition, essential supplies—Infantry, Artillery, Engineers, Reconnaissance elements.

But why worry about moving this way? Why not motorize our divisions? For one Infantry Division that would be a simple matter, but let's think in terms of, say, 100 divisions. Approximately 250 2½-ton trucks are required to move the foot elements of the division—100 divisions means 25,000 more trucks, and at 10 tires per truck, not including spare, another 250,000 tires—and rubber is no small item these days. Then consider the additional maintenance, upkeep, traffic control, gas supply, etc.

If the division needs to move any great distance and in a hurry, why not have a higher echelon

furnish the transportation? That's a reasonable demand, but frequently this transportation will not be available.

There will be times when it will be necessary to move by motor, and the additional motors are not



available, so why not take advantage of the organic mobility we have in the Infantry Division? We can't expect to cope successfully with a hostile force moving at 25-35 miles per hour if we only move at the plodding rate of foot troops 2½ miles per hour.

To illustrate one method of moving the division by its own transportation, a simple problem is presented for consideration.

The 1st Infantry Division will move from its present bivouac in the vicinity of Galt (see map)

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to another bivouac area in the vicinity of St. Luke-Hollow Creek. The situation is one in which contact with hostile forces is remote.

Directive:

"1st Inf Div moves by organic transport to bivouac area vicinity Hollow Creek-St. Luke (See map.)

"Covering force consisting of 1st Bn and At Co 1st Inf, Btry A 1st FA Bn, Co A 1st Engr Bn, will move on route 'B' at 0700 to position generally along Hollow Creek.

"CT 1 (less Dets) and CT 2 move in 1st echelon on routes 'A' and 'B' respectively commencing 0830.

"CT 2 and Div Trs [M Arty Bn, Engr Bn (-), Med Bn (-), QM Co, etc] will move in 2d echelon on routes 'C' and 'B' respectively.

"CT 3 and units of Div Trs will furnish additional transport required to move foot elements of CT 1 and 2 (1st and 2d Inf) in 1st echelon.

"CT 1 and 2 on arrival in new area will dump loads of trucks required to move foot elements CT 3 (3d Inf) in 2d echelon.

"On completion of movement of 2d echelon all units with their troops and normal loads will be closed in new area."

For what units must additional transport be furnished? The foot elements of the three infantry regiments are the only ones requiring additional transport. All other units in the division are fully motorized.

Following are basic data to be used in computing transportation required to move foot elements:

Total foot elements each Inf	
Regt (approx) -----	2150
Total foot elements each Inf Bn -----	675
Passenger capacity 2½-ton trucks ----	25
Trucks required 2½-ton:	
Inf Regt -----	86
Inf Bn -----	21
Hq & Serv Co of Inf Regt -----	5
AT and Can Co -----	0

Knowing the amount of transportation required to move the foot troops, the next step will be to determine the availability of transportation.

Note that above mentioned truck requirements are in terms of 2½-ton trucks. How about ¼-ton and ¾-ton trucks, shall we use them? Their use should be avoided for the following reasons:

First: over one-half of the ¼-ton and ¾-ton trucks are the prime movers or carriers for antitank guns and infantry heavy weapons; over one-third are used for command, reconnaissance, and communications, and the remainder for medical service and motor maintenance. These should all remain with their units for the performance of normal functions necessary during the movement such as reconnaissance, communications, protection of the column, route of advance, and the old and new areas.

Second: their capacity as troop carriers being materially less it would greatly increase the number required with a resulting increase in the length and time length of columns.

The table on the following page shows the 2½-ton trucks of units moving in the 2d echelon that might be considered available for the movement of troops in the 1st echelon (1st and 2d Inf). The table can also be used as a suggested priority of transport to be used in motorizing an infantry battalion as a reserve.

Note that the prime movers are omitted from table. In a tactical movement they should not be separated from their weapons. Motor maintenance vehicles also omitted as they should accompany columns to make emergency roadside repairs. Trucks of Div Hq & Hq Co, MP Plat, and Rcn Tr are omitted. Their numbers are few. Div Hq will be moving its own personnel and equipment during the movement, the MP Plat will be occupied with traffic control during the movement and will need its transportation, and the highly mobile functions of the Rcn Tr should not be restricted by taking the few supply vehicles it has.

The next problem is, how shall we assign the transportation for the movement of foot troops in the 1st echelon?

For purposes of assignment of trucks, the troops of the covering force (1st Bn 1st Inf, Reinf) can be considered as part of the 1st echelon. The trucks can be assigned to CT 1 for allocation to its units as the commander sees fit.

The following indicates one solution for movement of the 1st echelon:

1ST ECHELON		
	1st Inf (CT 1)	2d Inf (CT 2)
Troops to be moved -----	2150	2150
Trucks required—2½-ton (2150 ÷ 25) -----	86	86
Trucks furnished as follows:		
1st QM Co -----	48	
	38	
1st Engr Bn -----		32
		54
1st Med Bn 6; 1st Sig Co 5 -----	11	
	27	
4th FA Bn (155-mm How) -----	27	
	--	
3d FA Bn (105-mm How) -----		27
		27
3d Inf -----		27
		--

MOTOR MOVEMENT BY ORGANIC TRANSPORTATION IN THE INFANTRY DIVISION

AVAILABILITY OF MOTOR TRANSPORT FOR TROOP MOVEMENT

	Normal Use	3 Inf Regts (ea)	3 105-mm Bns (ea)	155-mm Bn	Engr Bn	Med Bn	Ord Co	QM Co	Sig Co	Total
1	Cargo Trucks							48		48
2	Personnel and Baggage		3	3	2		1		8	23
3	Organic Equip	2	5	5	6	9		1	2	44
4	Kitchen	19	5	5	4	4	1	1	1	88
5	Ammunition	9	15	3 (4T) 12	2					89
	AT mines	2			3					9
6	Engineer Personnel and Tools	1			18					21
7	Engineer Squad Tools				27					27
8	Spare Parts						6			6
9	Command and Operations	1	1	1	1		1	1	1	11
10	Attached Medical	1	1	1	1					8
	TOTAL	35	30	30	64	13	9	51	12	374

Discussion of preceding solution: All 48 cargo trucks of the QM Co were assigned to one CT to facilitate control and maintenance. Being organized in three platoons of 16 trucks each, assignment could also have been by platoons, two to one CT, and the remaining one to the other CT. Distance and supply situation would be determining factors in using all 48 trucks in the first echelon.

Of a total of 64 listed as available in the 1st Engr Bn a total of 32 were used, enough to fill the requirements of one infantry battalion (27) and the Hq Co and Serv Co (5) of the 2d Inf. Which 32 trucks they would be, would be for the battalion commander to decide. Road maintenance and repair, demolitions to be executed, road blocks to be built, etc., would be some factors affecting use of engineer trucks.

Trucks from the Medical Battalion used in moving the Clearing Co (and Station) could be used in 1st echelon as the Clearing Co would not be moved forward until troops have been moved out. Its trucks with 5 from the Signal Co were assigned to one CT—again for control and maintenance. During the movement the Signal Co will still be occupied in maintaining communications in the old as well as establishing communication in the new area.

The 3d Inf, 3d and 4th FA Bns will all move in the 2d echelon. Therefore the bulk of their transportation is available. 27 trucks from the 4th FA Bn completes the requirement of the 1st Inf. 27 trucks each from the 3d Inf and 3d FA Bn (Members of CT 3) were assigned to the 2d Infantry which completes its requirement. Note that 27 trucks is the amount required for each Infantry battalion, so the above assignment facilitates control and assignment within the subordinate units.

Location of units within the present bivouac area should also be considered in making truck assignments. For example, to assign trucks of CT 3 to assist the 1st Inf and trucks of the 4th FA Bn to assist the 2d Inf would necessitate needless movement and cross traffic in this particular situation.

Note that no trucks of CTs 1 and 2 have been used to assist in the movement of their foot troops. They move to the new area intact with all their troops, weapons, ammunition, equipment, and supplies normally carried.

Now where shall we get trucks to move the foot troops of the 2d echelon, those of the 3d Infantry? (86 trucks required).

It must be kept in mind that the trucks used to move troops in the 1st echelon must return to pick up the loads dumped in the old area, and therefore are not available to move 3d Infantry foot troops. There is one exception to this, some of the cargo trucks of the QM Co carry no prescribed loads. They can be used again to haul troops as they have no loads. However, the Division Commander may decide it is more important to use these trucks to haul additional ammunition without delay in a particular situation and therefore would not be available. So let's assume they are not available.

It will then be necessary on arrival of CTs 1 and 2 in the new area to dump the loads of the necessary number of trucks to assist in moving the foot elements of the 3d Infantry.

The following is one solution for the movement of the 2d echelon:

2D ECHELON

	3d Inf (CT 3)
Troops to be moved	2150
Trucks required—2½-ton	86

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Trucks furnished as follows:

1st and 2d Inf—each 27 -----	54
	32
1st and 2d FA Bns—each 16 -----	32
	--

How does the number of trucks taken from each affect the supply situation? Inasmuch as all their supplies accompanied CT's 1 and 2 in the 1st echelon they will still have them, and in their new location. Necessarily some ammunition loads will be dumped because of the number of trucks used to assist the 3d Infantry. However the number will be small.

Let's take another case. Assume that enough QM Co trucks are available to move one infantry battalion (27), that would materially cut down the number to be furnished by CT's 1 and 2, and permit the units concerned to haul more ammunition with their own trucks.

The plan just presented is not the only solution

to a movement by this method. Another plan would be to move all three CT's in the 1st echelon, less a small number of troops, say three rifle companies from each Infantry Regiment, to be moved forward in the 2d echelon. This would necessitate that each CT help move its own troops in each trip. Administrative loads, such as kitchens and baggage, could be dumped to get the necessary trucks, trucks that would not be needed initially in case the units become engaged. Administrative vehicles thus made available could be used to move troops and ammunition in a first, second, or even a third trip and return to pick up their loads later.

Advantage must be taken of the mobility that our Infantry Division has. A few type plans, well known to all, should be adopted as Standard Operating Procedure for each Infantry Division. Modification of a particular plan to meet a specific situation will save time and trouble as opposed to a new plan drawn up on the spur of the moment.

The Military Geologist

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Die Wehrmacht*.]

Just as the Air Force cannot get along without the support of meteorologists, the army would be unwilling permanently to get along without the collaboration of geologists. At the present time there is a geological section in every German army, ordinarily under the chief quartermaster or the commander of the army engineers. Information with regard to construction material as well as general estimates of the soil are the main fields of activity for such a military geological section which, conducted by an official of the higher technical service, consists of a total of nine persons. They discharge their tasks in close cooperation with the various command and service units of the army. For instance, in Soviet Russia it is their duty to indicate to road workers and road construction authorities suitable construction materials within practical reach of the roads which are to be improved. In a swampy loamy region in which nothing is possible but a corduroy road constructed of many thousands of tree trunks it is of the greatest importance to find sand or even gravel with which to cover the road. The indication of the need for such construction material is based on scientific knowledge or on one's own investigation of the condition of the particular road. In the region of the steppes, which offer no usable construction materials on their surface, special troops employing electrical methods have located usable stone at certain depths under sand or loam, making it unnecessary to sink exploratory shafts in

hopeless places with a loss of a great deal of time. These discoveries are recorded on maps of varying scales, which are handed over to the chief construction or technical staff concerned. The military geologist is called in when it is necessary to determine the favorable course of a road through an unknown operational region with respect, for instance, to flooding by rivers, etc. The artilleryman seeks advice from him in locating heavy guns. The softness or firmness of the soil must be considered in locating positions for guns of the heaviest caliber. Safety measures are suggested in construction work, and at times the proper materials are indicated.

On water supply maps, all known wells, springs, water pipes, reservoirs, etc., are marked, with data concerning the nature of the water in all areas through which the troops advance, and these maps are handed over to the forces, at times even down to the battalions. In difficult situations the geologist has to locate water for the troops, which the drilling section of the technical battalion then drills for. Through the use of air photographs, the geologist can be of help to the army engineers in determining suitable places for crossing rivers. The nature of the soil and of the subsoil on a river bank—the fact that piling can or cannot be driven into it—is of extreme importance in the selection of a place for crossing and the type and quantity of material to be employed. Indeed, even the

height and direction followed by high water and the nature of ice drifts, winds, and waves that must be expected in streams, rivers, or arms of the ocean are important fields of investigation for the geologist. The counsel of the geologist can be of great importance in the establishment of a new combat line. Even though the direction followed by the line of a fortified system of trenches is first of all or even exclusively dictated by great tactical considerations, yet attention to indications concerning the soil and ground water may be found very advantageous. Indeed practical suggestions for drainage have saved many positions from being inundated.

That the estimate of the terrain can also have a part in determining the decisions of the command seems evident. For in addition to the weather that can be expected, the nature of the terrain, vegetation covering it, and possibilities for travelling on foot or in vehicles are very important. Knowledge of the workability and firmness of the ground is just as important with reference to the construction of our own positions as it is in judging the resistance of the enemy's positions to our own artillery fire and bombs.

The more our forces advance from known and explored areas of Europe into unknown regions of operation, the more important and significant appears the work of the geologist who is a counsel to the command even in technical matters.

The Duties of a Division G-1

(An extract from Chapter One of a text of the same title
being compiled at the Command and General Staff School)

THE GENERAL STAFF VIEWPOINT

1. DUTIES OF THE GENERAL STAFF.—

a. General.—"The General Staff is the adviser of the Commander, furnishing him full information on which to base his plans and decisions and in such digested shape as will relieve him from the fatiguing study of details. It foresees the needs of the Command in all that relates to personnel, operations, intelligence and supply. It prepares strategical, tactical and training plans in accordance with the Commander's decisions. It coordinates the agencies within the Division—the various services and technical agencies—wherever there is a duplication or competition or combined action on the part of two or more, thus insuring concerted action by all members of the team. It controls or directs, in that it is the mouthpiece of the Commander, the agency which formulates and issues in his name the orders and instructions necessary to carry out his plans and decisions. It supervises by seeing that those orders are carried through to conclusion." (C. & G. S. S. Text.)

b. The Staff Officer's Approach.—A STAFF OFFICER COMMANDS NOTHING. He must keep this always firmly in mind. His success therefore, depends largely upon his own personality, intelligence, and the point of view he brings to his job.

There are two mental approaches to a staff job which its holder may take in varying degrees. One spells failure, the other satisfaction and success. The former, too often encountered, is that of patronizing arrogance—a belief that the staff officer is subtly above and beyond his fellows, that he need not concern himself with the troops as long as he makes a good impression on the Commander. This attitude complicates the problems of subordinate units by a display of impractical theories, a lack of concern for the problems of troop-leading, and a lack of understanding of the conditions under which the troops are operating. It sets a barrier between the Commander and his troops and in every way handicaps the smooth functioning of Command.

On the other hand there is the belief, unstated in the opening quotation but implicit in its successful application, that the staff officer serves his Commander best who first serves his troops. This approach tries to help the troops, to get close to them and understand their problems, to gain their confidence, and to help them solve their difficulties. It acts not as a barrier but as a portal through

which the Commander and his troops can reach each other. The staff which believes that its only claim to existence is service to the line is the staff that will be successful in battle.

To attain such a mental balance and to maintain it in the face of rebuffs and discouragement is not easy, especially to the officer who, either as a professional soldier or business executive has been accustomed to command.

Nevertheless it is worth the effort. The niceties of staff and command relationships are so delicately balanced that only unremitting self-vigilance will carry it through.

c. Qualities of a Staff Officer.—The maintenance of such a balance calls for leadership ability among staff officers as well as among Commanders. Great staff officers are as rare as great Commanders, and for the same reason—the combination of leadership and military capacity is a gift not everyone enjoys. The staff officer who possesses it usually becomes a Commander in his own right.

The good staff officer must therefore be a thoroughly competent soldier and a leader. He must be more. He must be a technician as well. He must be able to plan simply and logically and accurately with his feet on the ground, and he must know how to get things done. Since he exerts no direct authority, he must control while not appearing to do so, with a fine regard for command prerogatives. This is especially true of G-1, all of whose duties impinge so closely upon the functions of command that he must be tactful to the greatest degree.

2. GENERAL DUTIES OF A DIVISION G-1.

a. Responsibility.—While it is perhaps too much to say that a poor G-1 will ruin an organization, it is not too much to claim that a good one will have a tremendous influence upon the building of an efficient unit. Consider for a moment the material with which G-1 works. His task concerns personnel as *individuals*. In other words, G-1 affects the life of a unit, not as cogs in a machine but as a mass of tiny parts, each having a complex and different personality. He deals with soldiers, not as a type but as men, no two of which are alike.

It is a task of tremendous difficulty but of an importance which our Army has been late to grasp due to peacetime emphasis on administration rather than combat training. The closer a unit approaches to the combat zone, the more important become the psychological and

morale factors as compared to the physical. The G-1 has a great responsibility which he must face under many disadvantages, not the least of which is this inherited peacetime emphasis on administrative details—but if he overcomes them he will have contributed much to eventual victory.

b. Mission.—Applying all of the foregoing general principles specifically to G-1, we find that his mission is to assist his commander in the performance of his administrative and tactical duties as they apply to the soldier as an individual; to relieve him of all the details in connection with these functions so as to leave his mind free for the important decisions; to gather unbiased information for him so that he can make proper decisions; to be prepared at all times with plans and recommended policies regarding all phases of personnel and morale work for his consideration; to know conditions as they exist in all units so that these recommendations will be sound and based on fact; to act as the agent of the Commander in harmonizing the plans, duties and operations of the various organizations and services in the Division; to prepare detailed instructions for the carrying out of the announced decisions of the Commander and to supervise the execution of such instructions. Most important, his MISSION is to know at all times the state of the "fighting spirit" of the unit and to make recommendations to the Commander on matters which affect it.

c. The General Staff Viewpoint.—G-1 is not, as sometimes called, "a glorified Adjutant General." He should not be a "desk soldier." He is not an operating agency. He must be "combat minded," not "administrative minded," that is, he must be looking forward toward the enemy, keeping in mind what effect that enemy will have on his troops—not looking backward wondering if he will be "skinned" by some higher headquarters for failing to comply with some regulation.

He must therefore keep the General Staff viewpoint at all times and must not let himself become involved in the details of operations that should be performed by the Special Staff. This General Staff viewpoint is identical with that of the Commander because the Commanding General and his Staff are inseparable and should be of one mind. As emphasized before, however, G-1 should be sure that he does not assume any of the prerogatives of command, remembering that in his issuance of instructions and in his supervision of the actions of subordinate

units that he does so only in the name of the Commander and in furtherance of his approved policies.

d. General Duties of G-1.—A Division G-1 is concerned primarily with activities affecting the health, well-being and spirit of the individuals making up the Division and in building up and maintaining the Division at its authorized strength, with each man assigned to his proper job and imbued with the fighting spirit or the spirit of service, depending on whether he is in a combat or a service unit.

The Staff Officers Field Manual lists the specific duties assigned to G-1 for staff planning, policy making and supervision. These duties are listed in the Section headings of this text. These Sections have been prepared in check-list form. No attempt has been made to copy the various manuals (to which references are given in each case) or to explain the "why." For brevity, only the most important details have been listed under each heading.

G-1's duties naturally fall into two general classifications—those of primary importance during the activation and training period of the Division and those performed during combat. The former are the most important, for, while all training is directed toward success in battle, G-1's work is almost over when the unit reaches the battlefield. If he has done a good job the Division will be mentally as well as physically ready for this combat—if he has not, neither brilliant tactics nor superior staff work will then save it from defeat. This fact is often overlooked by those who fail to understand the importance of the personnel and morale problems facing a Commander.

Due to the fact that morale is such an

important function this subject is considered separately in Chapter 3.

(It should be noted that in this discussion "personnel" does not mean paperwork, "morale" does not mean entertainment.)

The principal combat duty of G-1 is the control of civilians and refugees. The foregoing statements are not intended to minimize this important function. The battles of France and Bataan furnish sufficient evidence that early and detailed planning and vigorous execution are vital. Otherwise, the Division may be prevented from ever getting into combat, or may find its operations seriously handicapped by masses of refugees which interfere with movement of troops and supplies. This, and other combat duties of G-1, are considered in detail in Chapter 4.

3. QUALIFICATIONS OF A G-1.—Since G-1 deals primarily with human beings he should have certain characteristics to a higher degree than need be expected in other staff officers. First of all he must have a genuine and sincere interest in human beings. He must *like* people and be able to get along with them. He should have the ability to find out what men are thinking about, growling about, and learn their reactions to orders, to news from home and to news of the enemy. He must know what rumors are circulating. He must understand the problems of the soldier and the leader alike and the difference in their reactions. He must keep their interests always in mind, realizing at the same time that the interests of the individual must be subordinated to the good of the unit as a whole and to its battle efficiency. In this connection, G-1 must be enough of a leader to be able to assist his Commander

in molding the thought of soldiers so that they will accept this last fact—not by trying to force it on them. Willing, intelligent cooperation of thinking men is the objective he will have to strive for. No other method will work with the American soldier, but by using his characteristics of intelligence, resourcefulness, adaptability and willingness he can be made superior to his enemies and can overcome their initial advantage due to many years of indoctrination.

To be able to accomplish all this, G-1 should have: a high degree of intelligence and common sense; initiative and resourcefulness; executive ability; a highly developed sense of duty, loyalty and justice; energy and enthusiasm. He should be aggressive because a man interested in developing the fighting spirit of men in a unit cannot be soft and easy-going.

He should have special and thorough training in personnel matters and experience in handling them.

He must have a capacity for details, but a clear-sighted ability not to be buried by them—a sense of perspective.

He must have leadership ability—the ability to handle human beings, to co-ordinate, to smooth out difficulties and arguments, i.e., he must have a knowledge of practical psychology.

He must have sincerity, consideration and tact. He must be a diplomat.

He must have a pleasing personality and a sense of humor.

Finally, he should know thoroughly the duties of the other staff members so that he can not only coordinate his work with them, but so that, in combat, if his duties are not heavy he can assist them or even substitute for them during their absence.

Where regulations of the service, as a kind of second nature, prescribe for the masses, reflection must be the guide of the General, and in his case individual boldness in action may easily become a fault. Still, at the same time, it is a fine failing, and must not be looked at in the same light as any other. Happy the army in which an untimely boldness frequently manifests itself; it is an exuberant growth which shows a rich soil. Even foolhardiness, that is boldness without an object, is not to be despised; in point of fact it is the same energy of feeling, only exercised as a kind of passion without any cooperation of the intelligent faculties. It is only when it strikes at the root of obedience, when it treats with contempt the orders of superior authority, that it must be repressed as a dangerous evil, not on its own account but on account of the act of disobedience, for there is nothing in war which is of greater importance than obedience.

—Carl von Clausewitz.

Training Aids to Military Instruction

Prepared under the supervision of The Director of Training, Headquarters, Services of Supply

In any discussion of "training aids" certain preliminary remarks are in order. The term "training aids," as used in the Army, encompasses almost the entire field of illustrative material—the visual aids, sound aids, and the various combinations of the two. All are appropriately classified under the general term, "Training Aids" as they can do no more than aid the trainee in his acquisition of military knowledge.

Let us briefly review the various types of training aids available to the average military instructor. Our first and best aid, in many instances, is the actual object concerning which training is being given. All other training aids may be said to be substitutes for, or supplementary to its use. Many other training aids, however, used in combination with or entirely independent of the actual object will frequently speed the student's understanding. In this category we have such aids as the model. We have the schematic model, which by reducing the principles involved to their simplest possible form, brings them within the realm of the individual's previous field of knowledge. We have the more complex technical models. Models may simulate actual conditions such as war wounds. For this, the moulage is very effective. Charts and graphic portfolios are often used to present in miniature or in magnification the essential elements of a situation or object. Like the model, they lend themselves readily to use at a moment's notice at almost any point where an audience may be gathered. The use of the sand table, the photograph and the mosaic are so common to the average army trainer that to mention them here seems almost superfluous. Posters are excellent for emphasizing outstanding points in previous instruction. They are the great reminders. Many synthetic devices have been developed. These are simply substitutes for the article itself that can better be employed in certain phases of applicatory training. An excellent example of this is the M5 tracer controlled trainer used to instruct the enlisted man in antiaircraft firing. This is a compressed air actuated device combining tracer effect with proper timing, vibration and recoil of the weapon.

All aids mentioned have certain attributes in common which play a large part in determining their suitability for use in any situation. They are complete aids requiring no supplementary equipment. They can be used in broad daylight and in most instances, at that place where applicatory training is carried on. They constitute excellent "point of practice aids."

There are a group of aids to training that lend themselves to inclusion in none of the above or following categories. One may characterize these as general aids not peculiar to the subject but implementing its teaching. In this classification are such aids as the blackboard and the shadow box screen.

The great majority of training aids being produced locally, come under the staff supervision only during inspection. Such aids are mainly in the form of charts, models and posters since these mediums are well suited to training in the more technical subjects peculiar to a particular service. Because training films and film strips are by their very nature, suited to central production and are subjected to a degree of supervision which has not been apparent in the case of other training aids, the idea has arisen in some quarters that our interest is restricted to these latter mediums. This is counter to fact. Where other types of training aids of general interest to the army have been prepared, the Director of Training, Services of Supply, has maintained continuous supervision. In fact, several such training aids are currently being processed. In distribution is a graphic portfolio on rifle marksmanship. This consists simply in a series of related charts covering the several lesson periods of a manual, bound together at the upper margin and suspended in a case which serves both for shipping and as an easel. On the reverse of these charts is pertinent textual material. This graphic portfolio embodies the advantages and disadvantages of other "point of practice aids." It can be set up in broad daylight at the rifle range. It is a complete unit requiring no accessory equipment. Both the pictures and textual material are constantly on hand to be referred to by the soldier at any time when not actually on the firing line. Its main limitations are that its size restricts its use to small audiences and that it is unsuited for subjects in which motion is essential to teaching. Other portfolios in preparation, under the supervision of the Director of Training, deal with "Protection Against Chemical Casualties," "Scouting and Patrolling," "Map Reading," and certain aspects of First Aid. Posters dealing with venereal disease control, camouflage, and the security of military information are in preparation and will soon be released. Tank and aircraft identification posters for 26-sheet display billboards are being processed. In the field of the synthetic device are a new sighting device and a cardboard compass. In order that outstanding aids to training, brought to our attention by inspectors and others, may

receive more general use throughout the army, there is in preparation a loose leaf catalogue embracing this material which will be released to all G-3's and S-3's of Services of Supply units. New material to be included in this volume will be disseminated to the field as it becomes available. The degree of success of such a work will depend upon your interest in bringing the outstanding training aids to our attention.

Most versatile of all training aids is the motion picture. Its two major restrictions are its dependence upon reduced light, which limits its employment as a "point of practice aid" and the time necessary to its production. The shadow box screen has to a degree increased its field of application. We hope that further experimentation along this line may materially reduce this one great limiting factor to its use. The motion picture is new to no one and is common to, and popular with, the great mass of Americans. It allows us to teach greater numbers at one time than can be possibly taught by any other method. It gives us motion where motion is essential to teaching. It allows us to share our best instructors with the entire Army. It is often as useful in training the instructor as trainee. It gives us day at night, summer in winter and can bring the battles of the old world to our doorstep for study. Because of its versatility, however, it lends itself most readily to abuse. The training film, as has been previously stated, is time consuming in production and the number of essential films in preparation is increasing with a rapidity that may soon jeopardize the availability of film stock. Some idea of this expansion in the field of training film production may be grasped from the fact that in the year 1940 we released 21 training films. In 1941 108 were released and in the past year a little over two hundred fifty. It is estimated that during the year 1943, training film releases will approach 700. This is a tremendous expansion but we feel that compliance with the few suggestions relative to preparation and meeting deadlines contained in directives already issued (Tables A&B) will be of great assistance. In this regard, let me here inject a few words of advice borne of experience in reviewing a large number of films. The quality of a training film is, to a great degree, conditioned by the capacity of the Military Adviser assigned to its production. If a film justifies its production, it warrants the assignment of a good man to assist in its direction. Your Training Division should see that such a man is made available even though it may mean temporarily reliev-

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ing him from a position of responsibility. The training units in Service Commands can help in this regard. Before requesting approval of a training film or film strip, be sure that a place for its use exists within the training cycle and let us know specifically where you intend using it. When you charge an officer with its preparation, impress upon him the necessity of never trying to teach more in a film than would normally be taught in the same period without it. Aim at a training film not to exceed 20 minutes in length and you will seldom go wrong. Caution writers to be simple and direct in presentation. We should all remember that off-stage commentation is equally as effective in training as having the characters themselves speak and it cuts the production time and film stock required to about one-third. At the same time, it allows later corrections and modifications impossible where direct voice recording has been employed.

If the subject under consideration for a training film does not require motion in teaching or involve relationships that need to be brought out at one time, look to another medium rather than the training film. If some other aid will do the trick, you will be able to save months in making the aid available to the trainee.

Where motion is not essential to the teaching of a subject, the film strip may offer the medium of choice. When indicated it may be in color. It is less dependent upon darkness than a training film and can be quickly prepared at little cost. Admittedly, however, it is not an ideal "point of practice aid," although it more closely approaches this than does the training film.

It is gratifying to us to see the degree of improvement in quality which has occurred in the film strip within the last year. This improvement is primarily the result of increased experience and the presence of more skilled personnel in the preparing agencies. Part of the improvement, however, definitely stems from the efforts of the Director of Training and the Chief Signal Officer to standardize the technical procedures in preparation. In doing this the film strip was effectively employed to put over this procedure. This film strip was delivered to each preparing agency and to the Training Division of each service. It warrants frequent review by your film strip preparing agencies.

Several times during the last year we have been asked to justify our attitude toward the sound film strip. Since the sound film strip differs little from the training film except that it does not portray motion, it is realized that, in the eyes of some, our attitude toward its use is not understandable.

Although this medium is to a high degree used by manufacturers in their promotion work, its definite advantages over

the silent film in the field of military education have not been proven. Adoption of this type of training medium as a general policy would increase distribution and storage. Record breakage can be high. In addition, it would eventually necessitate the procurement of special reproducers for the purpose of playing 33 revolution per minute records. Time incident to preparation would be increased. Because of these difficulties, it is felt that the sound film strip should not be indorsed until definite indications for its use have been established. There is no objection to any preparing agency making experimental recordings. In fact, reports on such tests would be appreciated. For the present, however, all film strips will be initially prepared as though sound were not to be employed which means carrying required textual material on each frame. Two such experimental sound film strips have been prepared by the Director of Training and will both be available to those who may desire to see and listen to them. One of these films deals with the characteristics of the German Soldier and the other with the Japanese Soldier. They deal with that type of subject which does not require the instructor to be prepared to handle an applicatory phase of instruction following their presentation. This is considered a type of subject for which the sound film strip might best be employed.

No further attempt will be made here to evaluate the various training aids. It is considered that the instructor, realizing the objective to be attained by his instruction, can readily determine what aid or combination of aids is best suited to his particular needs.

A discussion of preparation leads naturally into the question as to how training aids get to the point of use. For a great amount of such material there exists no distribution problem since it is a matter of local production. The Chief of a Service is responsible for distribution of those training aids which he elects to prepare centrally for activities within his jurisdiction. He also distributes devices, models and the like, produced by his Service, for general distribution. Printed material of general interest to the Army, such as the Rifle Marksmanship portfolio is produced and distributed thru the Adjutant General's Office. The distribution of training films, film strips and film bulletins is a function of the Chief Signal Officer. Distribution of these is accomplished thru a system of Training Film Libraries in each of the Service Commands and in the Theaters of Operation. At present there are within the continental U. S. 200 such libraries of all categories. A Central Library exists at each Service Command, the others being spread out over the country in relation to local needs. As a general policy the central libraries maintain reserve stocks

of training films and film strips for all sub-libraries within the Command and lend films to troop units not located on posts where sub-libraries have been established. The initial issue of films and strips to all libraries within the continental U. S. is at present made by the Chief Signal Officer. Fifty-eight additional film libraries have been established in Theaters of Operations. Distribution to these is in conformity with the expressed desires of each Theater Commander.

The mechanical processes involved in handling, maintenance and supply of both projectors and films can best be accomplished as a Library function.

Motion picture and still picture projectors are now being reissued to Table of Allowances No. 20 to posts, camps and stations for deposit in film libraries. Distribution to units has been discontinued. While this change is in transition, there will, necessarily, be some confusion. The result, however, should be a marked improvement in the availability of projection equipment. In any case where a library of any class is serving a number of widely scattered areas, the quantities may be increased with the approval of the Commanding General of the Service Command. This will permit the retention of projectors on memorandum receipt from the library by units too remote to be adequately serviced.

Production and distribution of training aids are reasonably well in hand, but their utilization by the field is far from satisfying. We realize that a training aid will, in last analysis, be used if it fills a need and will not be used if it does not, unless someone makes its use mandatory. It is not our intention to force the use of any particular aid upon any particular instructor. Every legitimate method must be employed to make instructors see the advantages to be gained by their use singly or in combination and to teach proper employment. In making the instructor "training aid conscious" we must depend to a high degree on the effectiveness of Instructor-Guidance Programs established in training activities and the policy of previewing all new films as a post function. The Signal Corps is assisting in this regard by issuing "Key Stills" with training films to advertise their arrival and a total of 51 Visual Aid Coordinators are now on duty in the field, under the jurisdiction of either the Chief Signal Officer or the Service Commands. Their purpose is to advise and assist Commanding Officers of posts, camps and stations in providing adequate and centrally located housing of training film libraries and preview theaters; in systematic procedures for booking and inspecting films and film strips; in developing centralized control of projection equipment so that projectors may be adequately serviced and distributed to pro-

vide maximum projection facilities to all units, and all other matters of interest in relation to the training aid program. These Coordinators are being extensively utilized. Many excellent reports have been received as to the great help they have been to various units of the Services of Supply and the Army Ground Forces, and I recommend to Training Officers of commands, not employing such assistance, that they give due consideration to adopting this procedure which has met with such rapid approbation.

In addition, the Director of Training, Services of Supply has published FM 21-6 which lists all published Training Manuals, Field Manuals, Training Films and Film Strips. This is soon to be di-

vided into manuals FM 21-6 listing publications and FM 21-7 Training Aids. These will be supplemented shortly by a comprehensive manual on Army Instruction and another on Projector and Projection Equipment. The Training Aid Catalog has been previously mentioned. Centrally produced aids dealing with utilization are TF 7-295 and FS 7-7.

Probably the best way to popularize training aids is to insure that each aid used is the best possible for the purpose. Improper or unsuitable aids must not be allowed to remain in circulation once that fact is recognized. Look at all existing aids whether prepared locally or centrally with a critical eye. Take the necessary steps to rapidly eliminate the harm-

ful and the useless. This is most important if the visual aid is not to fall into ill repute. It is essential if we hope to attain maximum utilization.

Many of the errors of our early efforts have been corrected but we also know with respect to training films and film strips that many already prepared are not being used. If we hope to better the product, we must study those that are "shelved" to determine why they are not being employed and the active films for the "why" of their success.

Such studies are underway and it is through them that we will eventually develop better aids to teaching, better men for combat. The "pay-off" is on the battlefield.

Glide vs. Dive Bombing

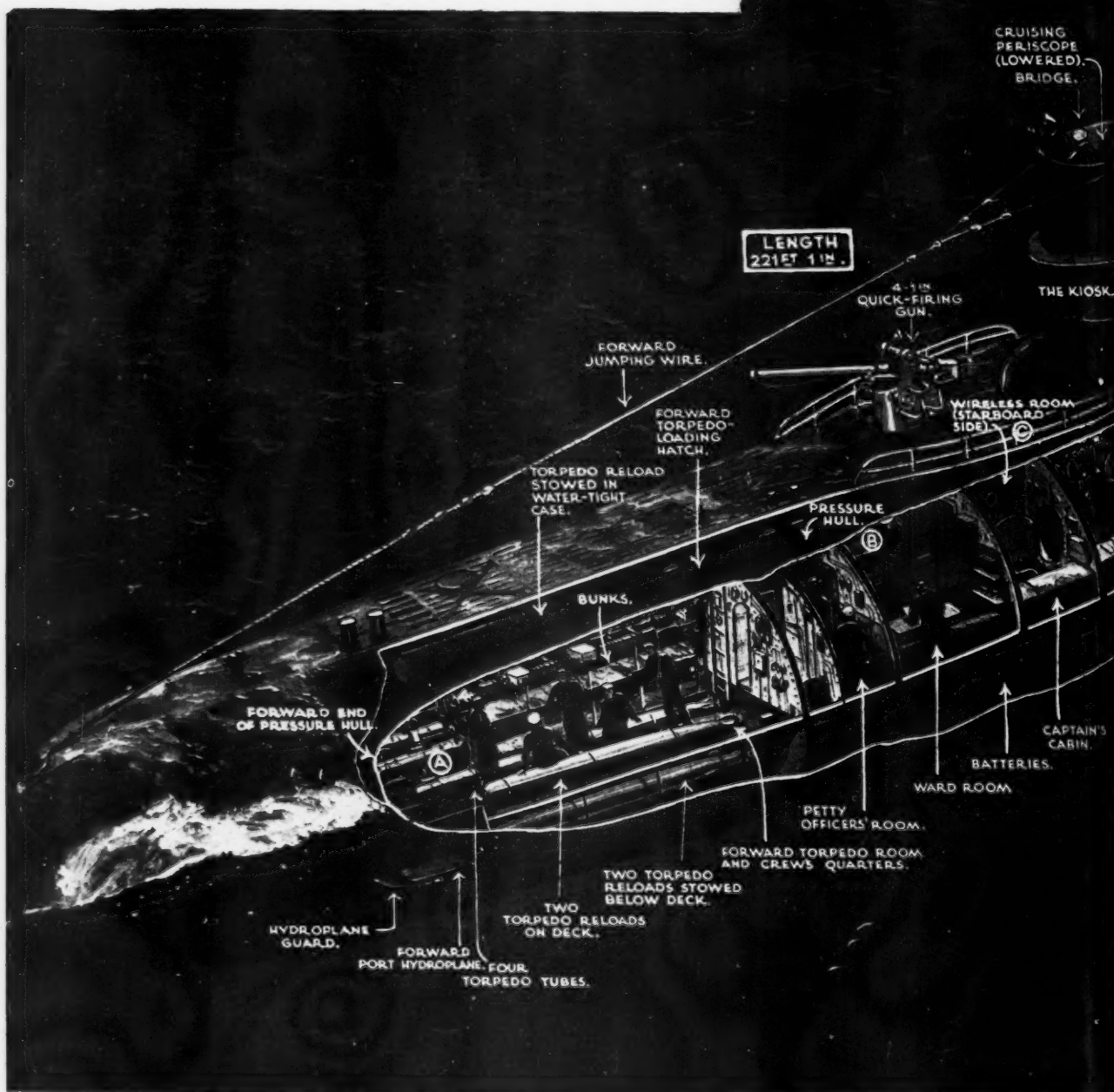
In close attack, steep dive bombing is twice as accurate as relatively slow and shallow glide bombing, and is only half as dangerous to the pilots. This opinion was expressed by Comdr. William R. Hollingsworth of the United States Navy, now a special air observer in London. In air actions in the Southwest Pacific, Comdr. Hollingsworth found that Japanese gunners shot down more glide than dive bombers, while glide bombers did relatively less damage to the foe. A dive-bomber pilot must be able to glide bomb in certain circumstances—for instance, under a low ceiling—and both types of attack can be used most effectively and economically against pinpoint objectives ashore and high-speed maneuvering targets at sea. However, the dive bomber provides no substitute for the horizontal and area bombing practiced largely by the Army Air Forces and the RAF, and is at its best as a support weapon.

Even the RAF, which has never itself built dive bombers, and at present considers fighter bombers as superior for ground-support missions, is getting ready to try out an American type, the Vultee Vengeance, first ordered in 1940. On 24 February Sir Archibald Sinclair, Minister of Air, stated that the Vengeance planes had begun to arrive and in some cases these new craft had already proceeded to operational bases.—From *Newsweek* 8 March 1943.

Secrets of a German U-Boat

Intricate Details of a Modern German Ocean-Going Submarine Revealed.

(Drawn in a captured U-boat by G. H. Davis,
Special Artist of *The Illustrated London News*.)

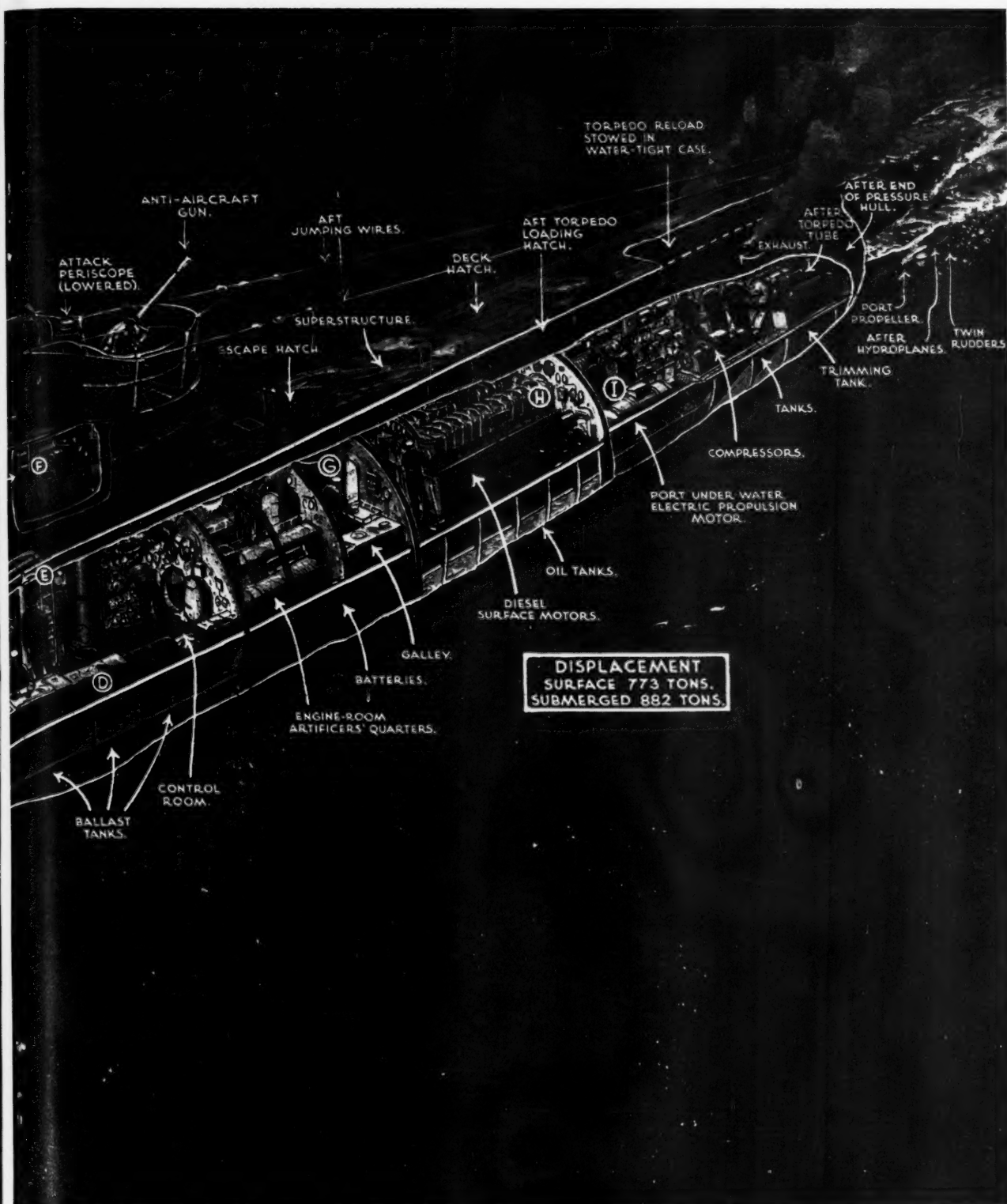


An explanatory drawing including all important mechanical and constructional

This double-page drawing of a modern German U-boat reveals many interesting details of these underwater vessels. With every available inch of space utilized and packed from end to end with machinery and accessories, the boat depicted is a typical example of the general type of submarines operating against us in this war, and of which the navies of the United Nations have taken so heavy a toll. Carrying a crew of approximately 45 officers and men, she has a length of 221 feet 1 inch and a beam of 20 feet 3 inches with a surface displacement of 773 tons and a sub-

merged displacement of 882 tons. When she embarks on a voyage her four bow torpedo tubes and her single stern tube are loaded, and in addition she has space for three torpedoes stowed below deck, two others on the deck of the forward torpedo room, and a final two in the superstructure. The last-named are stowed in watertight cases, and only in favorable weather can they be removed and lowered through special torpedo hatches to the torpedo rooms.

The underwater sighting equipment consists of a hand-operated cruis-



features of a modern German U-boat and dispositions of officers and men.

ing periscope and a massive electrically-driven attack periscope operated from the "kiosk" in the bridge structure. Diesel motors totalling 2800 horse power for surface cruising and electric motors for underwater propulsion drive twin screws. Twin rudders are provided for steering, and for diving the is equipped with hydroplanes fore and aft. U-boats of this type are usually armed with a 4.1-inch dual-purpose quick-firing gun mounted on the deck and a lighter antiaircraft weapon situated on a circular platform just aft of the bridge. These German underwater craft are efficiently de-

signed and constructed, but their interior is more cramped than is the case in our own submarines. The pressure hull is quite circular, to give strength against depth-charges; and added to this are two "bulges," carried rather high on the hull to port and starboard. Recent reports show that the U-boat packs are still one of the greatest dangers facing us.—*The Illustrated London News*.

The Employment of Corps Artillery

Prepared for the Military Review at the Field Artillery School, Fort Sill, Oklahoma

General.—*a.* Organic corps artillery consists of a headquarters and headquarters battery and a field artillery observation battalion. The corps artillery headquarters is commanded by a brigadier general. There are no *organic* corps artillery gun or howitzer units; these are attached from higher echelons when available and necessary.

b. The methods of employment of artillery attached to a corps are flexible and depend upon the particular situation. Reinforcing artillery allocated to a corps by a higher headquarters may be attached to the divisions of the corps; a portion may be retained by corps and the remainder attached to divisions; or it may be retained under the immediate control of the Corps. Any reinforcing artillery attached to a corps and retained under corps control is corps artillery.

Employment of Corps Artillery.—*a.* Centralized control of all artillery attached to the corps is usually impracticable except during coordinated corps action, such as when sustained periods of stabilization can be foreseen or when large amounts of artillery are massed for the attack of a prepared position.

b. It is essential that corps artillery be employed early in the action. Attaching all or a part of the corps artillery to the divisions is therefore usual. Such attachments include elements from the observation battalion (survey, flash ranging, and sound ranging), and additional headquarters, as well as gun and howitzer units. Corps artillery or portions thereof should be attached to divisions when:

1. The corps commander, through his corps artillery officer, cannot control the corps artillery owing to lack of positive communication means.

2. Elements of the corps artillery are beyond mutual supporting distance, so that their fires cannot be massed in a common area.

3. A particular division(s) has a mission that requires reinforcing artillery and the division(s) can better control this artillery.

c. In determining the amount of corps artillery to attach to the various divisions the following factors must be considered.

1. The enemy opposition anticipated.

2. The prospective employment of the divisions.

3. The road net available and the march formations of the divisions.

4. The terrain in the prospective combat areas.

Employment of the Field Artillery Observation Battalion and its Elements.—*a.* The field artillery observation battalion, or its elements, may be attached to divisions, or the battalion may be employed under corps control.

b. The corps artillery observation battalion can furnish two observation-battalion detachments. Each of these detachments consists of two flash-ranging teams and one sound-ranging section. Attachments to divisions are made variously, as dictated by the situation. The following is an example of the usual manner of employment of the detachment by the division artillery commander: The flash-ranging teams are attached to the light artillery battalion in two of the division combat teams for the purpose of assisting the artillery in the adjustment and observation of fire and to collect combat intelligence for the division commander. The sound-ranging section is employed with the medium artillery for counterbattery.

c. The detachment listed above is considered the minimum for successful operation with a division artillery. At times it may be desirable to reinforce this detachment with survey and additional command and communication personnel.

Staff Attachments.—In addition to the above, the corps artillery commander may attach intelligence and operations personnel from his staff to the divisions to assist in the organization for and conduct of counterbattery. The early functioning of the corps artillery staff also permits the corps artillery commander to keep abreast of the situation and to centralize control rapidly when the situation so demands.

Purpose of Attaching.—These attachments from the corps artillery give the division artillery commander a ready and powerful means of gaining ascendancy over the hostile artillery in the early stages of the engagement without diverting his organic units from missions in close support. Artillery in direct support must not be diverted to other missions when the supported unit is closely engaged with the enemy. Hence the necessity for attaching ample reinforcing artillery.

Missions.—*a.* Reinforcing artillery units allocated to the divisions become division artillery and are employed as such.

b. Reinforcing artillery when employed under corps control executes three general fire missions: namely, Counterbattery, long-range fires, and reinforcing the fires of the division artillery. Counter-

THE EMPLOYMENT OF CORPS ARTILLERY

battery is the primary mission. Air observation is nearly always essential. In addition to observation furnished by the organic field artillery airplanes, air observation should be furnished, upon request, by a high-performance aircraft from an observation squadron. Until such time as the observation battalion detachments are ready to function, air observation is practically the only means available for locating hostile batteries. The primary missions for observation by a high-performance airplane will be: Registration and adjustment of long-range artillery, reconnaissance of areas not covered by the observation battalion, verification of information obtained by the observation battalion, and surveillance of fires.

Positions.—*a. Attack.*—In the attack the corps artillery, in common with all other field artillery units, occupies positions well forward, since it must usually cover the forward displacement of the division artillery.

b. Defense.—Corps artillery is echeloned in depth to provide flexibility of fire and to permit continuity of support in case artillery in forward positions is forced back by local successes of the enemy. Gun units are given priority in choice of positions.

Employment of Fire Power.—There are three general methods by which the bulk of the corps artillery fire power may be made available in critical areas at critical times; a combination of these methods is usually employed. The methods are:

a. Attaching units of the corps artillery to appropriate divisions as, for example, the divisions(s) making the main effort.

b. Assigning to specific corps artillery units the missions of general support and reinforcing the fires of such division artillery supporting the main effort or the critical sector.

c. Arranging the lateral coordination (zones of fire) of the corps artillery units so that the bulk of the fire power may be placed, on call, in the zone of action of the unit making the main effort or in other critical areas. The accomplishment of this normally requires some sacrifice of range in order to attain the desired lateral control.

Survey.—Appropriate survey elements from the observation battalion should be included as a part of

the detachment mentioned in paragraph 3, above, or should be pushed well forward independently for the purpose of assisting and coordinating the survey of the division artillery and establishing a common survey control for all, or any part of the artillery, with the corps when appropriate. The type of common survey control established ordinarily will depend upon the amount of survey control available in the area, coupled with the type of firing charts which are to be used. Each battalion executes its own survey in order to expedite the early massing of the fires of its batteries. As higher echelons complete their survey, all units are progressively placed on a common survey control.

Observation.—Corps artillery units, especially when reinforcing the fires of divisional artillery units, have a need for observation in proximity to the leading supported elements. This need is particularly pressing in terrain that affords limited observation. Corps artillery units, therefore, send out forward observers. The functioning and communications of forward observers from corps artillery units that have a reinforcing mission must be coordinated with those of the division artillery forward observers that are operating in the same areas. When corps assumes centralized control of the corps artillery, the corps artillery commander must coordinate terrestrial, air, and flash and sound observation on the corps front.

Liaison.—The normal principles of liaison are applicable to corps artillery units. A corps unit reinforcing the fires of another unit sends a liaison officer to the headquarters of that unit.

Corps Artillery Fire Direction.—Corps artillery battalions shift and mass their fires by the same methods used by division artillery. The technical handling of corps artillery is almost identical with that of division artillery. Because of their wide zones of fire, corps artillery battalions may frequently maintain two firing charts. Corps artillery battalions attached to divisions are furnished survey control by the division artillery survey officer of the division to which attachment is made.

Another article, *Reinforcing Artillery Employed in Mass (The Attack of an Organized Position)*, will be presented in the Military Review in June. The two articles originally were Sections I and II, respectively, of a single text.

The difficult we can do immediately; the impossible takes a little longer.

IT CAN BE DONE!

—Anonymous.

The Japanese Are Tough

(Reprinted from *Air Forces General Information Bulletin No. 5*)

The Japanese soldier is a real killer.

It's not an accident. He's been taught from infancy to follow the code of the Samurai which enjoins upon the warrior absolute and unquestioning loyalty and teaches him that to die for the Emperor insures him an enviable place in the spirit-world where all his wants will be fulfilled forever. The Japanese soldier believes this blindly and passionately. To kill the enemies of Hirohito, incarnate spirit of the Sun Goddess from whom all Japanese, the favored race, are descended, is an honor. If he lives, he has been promised comfort and well-being for the balance of his life back in Japan. If he dies, he walks with dignity in the spirit world, a respected man.

Strangely enough, he also suffers from an inferiority complex. It enrages him that Japan had to copy the West to become a power in world affairs. It galls him that the white races are bigger physically and spurs him to work twice as hard. Having been imbued with the idea it is Japan's divine mission to rule all Asia, he hates the Englishmen and Americans who would prevent it. He hates Americans particularly because of our exclusion policy which has prevented his people from inundating this country with cheap labor which would lower our standard of living.

Because he thinks this way, he's tough. We can't face him according to old-fashioned Western conceptions of warfare and expect to beat him. We've got to give him his own business the cruel, hard, tough way. And we've got to be tough to do it.

When our air crews are forced to bail out, the Jap Zero pilots machine gun them all the way down.

"The Japs fight until they are killed, meanwhile disregarding all civilized conventions of warfare," says a report from Southwest Pacific. "They hold up their hands in surrender, then throw hand grenades."

The answer is we can't use civilized conventions of warfare against the Japanese and expect to beat them. Deep within us must be the insatiable desire to kill them. We must toughen ourselves mentally to it.

It is hard for us, reared to be peace-loving, to adopt a thoroughly warlike attitude. The Japanese don't think we can.

"They have put great store in what they consider to be the white man's flabbiness," declared our former Ambassador to Japan, Mr. Joseph C. Grew, upon his recent return to the United States. "They look upon us Americans as constitutional weaklings, demanding our daily comforts and unwilling to make the sacrifices demanded in a war against a military machine which has prepared and

trained itself in Spartan simplicity and the hardness and toughness demanded by war."

The Japanese soldier has been indoctrinated with the spirit of the offensive. Defensive action is considered unworthy of the Imperial Army. This spirit has been nourished and perpetuated since the founding of the modern Japanese Army. Ambassador Grew reports that the Japanese High Command has implicitly counted upon the advantages this would give them over less aggressive enemies.

"When they struck," says Mr. Grew, "they made no provision for failure; they left no road open for retreat. They struck with all the force and power at their command, and they will continue to fight in the same manner until they are utterly crushed."

We must realize, also, that to the Japanese soldier there is nothing dishonorable in deceit. *Anything* that will help kill is justifiable under his code. Dressed as a civilian among the polyglot populations of the Far East, he will shoot us in the back. If he captures some of our airplanes, he will use them against us, approaching as a comrade and then loosening a hurricane of death upon us. While his envoys are lulling us into a sense of security with talk of Peace, he will strike a blow at us.

The precision of their wide-spread assaults leaves no doubt that the grand strategy of Japanese military leaders to establish Japanese hegemony over all East Asia included years of tactical preparation. They picked the theaters of operation years ago and then set about training an Army to fight under the conditions existing in those localities. The Japanese soldier is a superlative jungle fighter only because of the intensive training he received in that type of warfare. This went to almost incredible lengths. In Luzon, for example, the Japanese controlled their troop movements by using whistles which gave forth tones similar to the notes of native birds.

Their initial success was aided also by years of establishing a fifth column, Nazi fashion, in the areas they planned to overrun. Malaya and Burma were honeycombed by fifth columnists who cached ammunition, sabotaged the defenders, established secret communications with the oncoming invaders, and undermined the loyalty of native populations to the British.

The Japanese studied native psychology and it paid them well. "In Malaya and Luzon," it is reported from the Southwest Pacific, "noises resembling machine-gun and mortar fire were produced in the rear of defending units to create panic; in the Netherlands East Indies, rappings on wood, cries and mysterious noises were used to act upon the super-

THE JAPANESE ARE TOUGH

stitutions of the native troops. Large numbers of firecrackers were either dropped from airplanes or set off by infiltration parties to create the impression that troops were being attacked from the rear."

So we are fighting an enemy who has prepared down to the minutest details. Add to this the Japanese soldier's disregard for death, his hatred for the Americans who would prevent his Emperor from becoming the ruler of a Greater East Asia, and his years of physical training to undergo terrific individual hardship, and we have a tough opponent indeed.

We must learn to perfection military tactics our strategists are devising to meet and overcome Japanese methods. And we must translate them into victory with cool minds, hating hearts, and strong bodies. Every qualified observer of the warfare in the Southwest Pacific and Far East knows this. In a recent report, the consensus of these observers was:

"The best morale among troops in the Far East was among those units which had received intensive field maneuver training, were in excellent physical

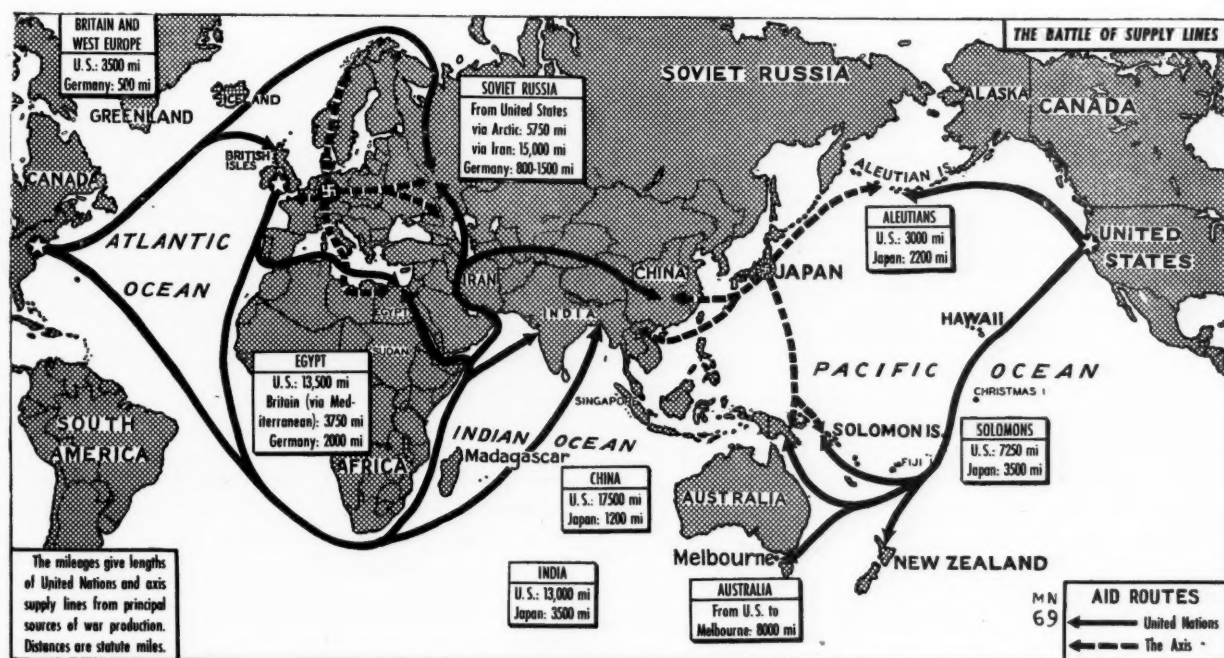
condition, and had been indoctrinated with the intent to kill. In these units, commanders and staffs were constantly familiarizing themselves with the terrain, inspecting dispositions, and assuring food and shelter for their commands.

"While the comfort measures now in existence in our home stations possibly serve to ease the metamorphosis of a civilian into a soldier, he can only be made into a rough fighter by exhaustive training and hardships, the bulk of which must duplicate battle actuality.

"Morale, not to mention battle efficiency, was lowest among officers and men who had come face to face with reality after a sheltered service. Here the commanders and staffs rarely left their command posts, neglected visits to the front lines, relying at times on oratory, rather than their presence, to inspire their troops."

So it is obvious that we must become tougher than the Japanese—and that's very tough. Only then will we obliterate the Rising Sun with the blood of its own soldiers.

United Nations' Supply Routes



THE WORLD MAP SHOWS THE GREAT DISTANCES TRAVELED BY SHIPS AND AIRCRAFT IN SUPPLYING OURSELVES AND OUR ALLIES WITH MATERIALS OF WAR.

Handling, Feeding and Care of War Dogs

Notes from "Training Memorandum Number 16" Issued by Headquarters, Hawaiian Department

SECTION I—HANDLING

GENERAL.—The sentry and his war dog form a working unit. Each one of them is an equal half of a team. The ultimate value of this unit depends upon the ability of the two individuals, as well as the amount of cooperation and coordination which has developed between them.

The performance of the war dog unfailingly reflects the work habits and attitudes of the master. If the master is exact, energetic and "on the job," the dog will be the same. If the master is slothful and careless, the dog will, in time, acquire the same characteristics.

Your animal has had his basic training and is ready for duty. Your future work with him at your post or on patrol will either develop him into a real service dog or ruin him. Your attention to the dog and your interest in him will show accurately in the dog's performance.

In order to perform well, your dog must be clean and healthy. Follow carefully the instructions as to his care and cleaning. A dog deserves and should receive a good grooming each day. You should examine him daily for cuts, wounds, ticks, and burrs.

If your dog works at night, feed him in the morning, because he works best when his stomach is empty. A full belly makes him sluggish.

Your animal is a working dog and *not a pet*. He should be friendly with the service men, but his attachment for his actual masters should be the most strongly-developed feature of him. Guard this attachment and do not allow any but his actual masters to caress, feed, or care for him. For the first two (2) weeks, all work is on leash. You must judge when his attachment to you will permit off-leash work and assure prompt recall.

Training and control is based upon reward for accuracy and correction for error. Every correction **MUST** be followed by an exercise easily executed, in order to give opportunity for an immediate reward for accurate work.

The name of the dog must always mean "come" and should never be used as a correction. Coming to his master must always be pleasant, because sometime this act may save your life.

Your dog can work correctly only if you give him the proper command at the right time.

The dog should be familiarized with all possible hiding places in his working environment. He should be taught (by actually going into these places with his master) that he is allowed to enter enclosures, rooms, drains, and other hiding places in his working area. Do a reasonable amount of work with the dog on a long quartering leash in order to

be sure that he retains the idea that he can work out at a distance from his master.

In all searching work, the man is one half of the unit. Observe your dog carefully so that you may know when he senses something different. Each dog shows his interest in a different way when a new smell enters his nostrils. One dog will speed up, another will check and stiffen, another may "point," and still another bark and growl. Study your dog to note any variation in speed, head position, muscle tension, or sound as the dog comes in wind of an interesting odor. Use only his name to turn him back to you, **NEVER** a "Phui," because he may have winded just the person or object for which you are searching. The moment you notice your dog's warning change of action, give him a low "Attaboy," then "Hopp-Hopp," and let him show you what he has found. A "Phui" or recall at such a moment may ruin the dog for this type of work. If the dog stops to empty his bladder or intestine while searching, allow the halt and do not give "Phui."

Practice with your dog. Familiarity of the dog with his working environment will develop the mutual understanding necessary to finished work. On your part, make a study of your dog so that his every action will convey some definite information to you. Such practice and mutual understanding are necessary to the greatest good in service, for it produces the working team which can function as a smoothly-coordinated unit. Make your team a real service unit, and your dog will help you every minute that you are on duty.

ATTACK DOGS.—*a.* The attack dog should have at least ten minutes each day of disciplined, snappy, obedience drill. This can be given as you go on duty or return from duty. The work must be accurate and given in a military manner on the part of both dog and master. Some marching should be a part of every obedience work-out.

b. In all obedience work the master's left hand denotes position desired of the dog and gives encouragement or caress. Neither hand ever gives a correction. Correction is by use of your voice, the chainette for the attack dog (when the dog is not watching), or a leash jerk.

c. Do not get in the habit of watching your dog during marching drill. You must learn to sense his position and let the dog watch you.

d. Your dog will remember his attack work **WITHOUT** frequent practice. Do **NOT** show off your dog.

WARNING DOGS.—*a.* The warning dog will not be accurate or consistent in warning until he has become attached to his new post and until he feels that

HANDLING, FEEDING AND CARE OF WAR DOGS

it is *his home*. The time required to accomplish this will vary from a few days to a month. The point to remember is that the dog must have a definite place which he knows is his kennel home and he must always be fed there. Do not allow the dog to sleep in various barracks and do not let others feed him at various places.

b. When the dog has made his new surroundings his home, then during the early night slip up on the dog in order to get him to bark. The dog can thus be taught to know that he is expected to bark whenever anyone approaches his post.

c. At posts having two warning dogs as a unit, both dogs will be kept tied or on leash during the first two (2) weeks, until they have accepted the post as home. After this time, one (1) dog can be loose while the other is tied. Alternate the dogs so that each has equal shifts when he is loose and tied.

COMMANDS.—Your dog is trained to recognize and to obey certain commands, which are given only when the situation calls for them and only when prompt obedience is expected. You cannot deceive your dog and still retain his respect; play square with him and he will be your most loyal ally. A command consists of word, tone, and gesture. Give your commands as you have been taught and insist upon obedience; your dog will then respect you and will be anxious to please you by doing your bidding.

COMMANDS

For Attack Dog	Meaning	For Warning Dog
Dog's name.....	Means "come".....	Dog's name
Come.....	Also means "come".....	Come
Heel.....	Close to master's left.....	(The warning dog remains within ten feet of master in any direction.)
Sit.....	To sit.....	
Hupp.....	To jump.....	Hupp
H-a-l-t.....	To stand.....	
Down.....	To lie down.....	
Rest.....	To remain where left.....	
Hopp-Hopp.....	To search at a distance.....	Hopp-Hopp
Assah.....	Attention or attack.....	ssss-ssss
Halt.....	To cease attack.....	
Attaboy or attagirl.....	Reward.....	Attaboy or attagirl
Stop it.....	Correction.....	Stop it
Phui.....	Correction.....	Phui

SECTION II—FEEDING

GENERAL.—The most important consideration, in keeping a dog in good health and condition, is his diet. Unfortunately, most people have not been properly educated regarding rations for dogs. Through ignorance, stinginess, superstition, hearsay, and carelessness, the stomachs of the large majority of canines have been woefully mistreated. The idea that a dog is a sort of animated garbage can, and capable of living on foraged odds and ends, or on the scraps thrown to him, is entirely wrong.

FOOD REQUIREMENTS.—Various foods are classified according to what they will supply to the animal system. In general they are grouped as follows:

Proteins.—Flesh making and tissue building.



Photo by U. S. Army Signal Corps

Mostly supplied to dogs in the form of meat.

Fats.—Energy and heat producing. Supplied in meat fats.

Carbohydrates.—Energy producing. Supplied in the form of bread and cereals.

Minerals.—Bone building. Cereals, vegetables, and bones.

Vitamins.—General health. Milk, vegetables, eggs, and meat.

APPROVED FOODS.—a. **Meats.**—The following kinds of meat are approved for your dog:

Beef, Mutton, Lamb, Eggs (raw), Chicken (well boned), Cooked fish, Horse meat.

b. **Vegetables.**—The following kinds of vegetables (always well mashed) are approved for your dog:

Tomatoes, Spinach, Carrots, Cabbage, String beans, Peas.

FORBIDDEN FOODS.—a. **Meats.**—The following kinds of meat are harmful for your dog and should never be fed to him:

Corned beef, Canned ham, Cooked eggs, Raw fish, Pork, Pork preparation (Spam), Veal, Bacon.

b. **Other foods.**—The following items of food are harmful for your dog and should never be fed to him:

Potatoes, rice, spaghetti, beans, nuts, fruits, cakes, pastries, and candy, starch foods, ice cream.

AMOUNT AND PREPARATION OF FOOD.—a. **Meat** should form the main portion of a dog's food. If we try to feed a dog on a diet from which meat (or its equivalent) is left out, we ignore the origin of the animal. When man found him millions of years ago, the dog was a meat eater; and we should continue to make this the main item of his diet.

b. For the larger breeds of dogs working in the Hawaiian Islands, a safe and satisfactory diet is from two-thirds to three-fourths meat, with the balance consisting of an approved vegetable, a cereal, soup, and milk.

c. A good rule to follow for the main meal is to feed one (1) to one and one-half (1½) pounds of meat to each fifty (50) pounds of bodyweight, de-

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pending upon the size of the dog and the amount of work he is required to do. If possible feed raw meat at least twice a week.

d. In order to maintain the proper vitamin and mineral balance, it is necessary to feed the dog a small amount of vegetables daily, in addition to his meat ration. Chop or mash the vegetables well and mix with the meat. Add one or two slices of bread, oatmeal mush, or like cereal, together with a small amount of gravy, in order to improve the flavor and make the mixture more palatable.

e. As a rule, one meal a day is sufficient for a mature dog. If he is not up to his proper weight, feed one can of milk diluted with water for breakfast.

f. The feedings at breakfast and supper will depend upon whether the dog is to work on the night or the day shift. Never feed the heavy meal just before going to work.

g. The following is a sample ration for a dog weighing 50 lbs., and it can be fed from a mess hall serving field rations:

1½ lbs of beef (cooked or raw)

1 tablespoon full well-mashed carrots, spinach, greens, or tomatoes.

2 slices of bread or equivalent amount of a good cereal (either dry or cooked).

1 tablespoon full of gravy.

Mix this feed together well before feeding. These quantities depend more or less upon the amount of work a dog is doing and also upon his condition.

h. On these days when ham or non-approved meats are being served, ask the mess sergeant for some of the left-overs from the day before, or for some frozen meat which can be thawed out in time for today's ration of meat for your dog. Canned salmon and canned-beef stew can be used in case other foods are not available. Large bones that *cannot* be splintered are good to give the dog as an occasional delicacy.

DRINKING WATER.—Water should be drawn fresh as often as possible and placed in a cool and shady place within easy access of the dog at all times. Do not allow him to drink from stagnant pools. His water dish should be cleaned out daily and boiled at least once a week.



Photo by U. S. Army Signal Corps

HANDLING, FEEDING AND CARE OF WAR DOGS

SECTION III—CARE

GROOMING.—If a dog is groomed properly every day, it will seldom be necessary to bathe him. A good brushing both with and against the lay of the hair for fifteen (15) minutes each day will keep a dog clean, and maintain his skin and hair in healthy condition. After brushing, rub the hair down with the hands. Go over the dog daily at grooming time for ticks, and remove them by hand. Ticks, lice, and fleas live and breed mostly in the ground and on the surrounding foliage. See that the dog's surroundings and bed are kept clean and disinfected, in order to lessen the presence of these external parasites.

KENNELING.—Do not allow your dog to sleep in a damp or unsheltered place. A rug or an old blanket, that can be washed weekly and then can be placed in a corner or under a bunk, is all that is required in this climate (Hawaii). An unclean blanket is an excellent breeding place for lice and fleas. If the dog is kenneled in an outside kennel, see that there is sufficient shade for him during the heat of the day.

MEDICAL SERVICE.—If your dog gives evidence

of need for medical attention call for the nearest veterinarian. In the absence of a veterinarian, any member of the medical corps will be glad to assist. Remember that a dog's *normal* temperature varies between 101 and 102 degrees Fahrenheit; a dog's normal pulse rate is quite irregular and varies between 90 and 130 per minute depending upon his size.

SUMMARY.—Food requirements and kenneling instructions are to be taken as a guide and they should be followed when such food and surroundings are available. In those cases where directions cannot be followed as per instructions, it is up to you to fulfill these requirements as closely as possible. A good rule to follow is to feed your dog as you would yourself, leaving out the sweet foods, and lessening the starchy foods as much as possible. Keep your dog dry and clean. Like his master, a dog does not like to be wet and dirty.

RESPONSIBILITY.—All dogs in this service have been enlisted for the duration of the war. While in your hands, the dog is your responsibility and must be given the best possible care.

Organization of the Hungarian Army

About forty percent of the Hungarian Army is engaged on the Soviet-German front.

The core of the Hungarian army is formed by infantry units (seven army corps) comparatively lightly equipped. The 8th and 9th Corps organized recently include tanks and motorized infantry and motorized artillery of heavy calibers. Hungarian air strength is small. There are only two fighter regiments, and one bombardment and reconnaissance regiment.

The fundamental unit within the army corps is the regiment consisting of three infantry battalions and a number of small specialist units. In addition to this each regiment must have a reserve battalion stationed near the front lines. This battalion does not take part in action but forms a source of replacement. In actual practice, however, there are almost no such reserve battalions in the regiments.

The infantry squad consisting of 10 to 12 men is the smallest independent unit within the regiment. In units which have sustained heavy losses squads consist at the present time of not more than seven men. The squad is armed with one tommy-

gun, one machine pistol, 8 to 10 rifles, and two hand grenades to each man. The platoon consists of three squads and the company includes four infantry platoons, heavy weapons platoon, headquarters and train.

The heavy weapons platoon (24 to 30 men) is divided into the mortar and anti-tank rifle sections. The mortar section has two squads of six men each. Each squad has one 50-mm mortar. The anti-tank rifle section consists of two squads of 5 or 6 men each; each of these squads has one anti-tank rifle. The company numbers 160 to 190 men. In the four platoons of the machine-gun company there are twenty "Schwarzlose" machine guns. In the mortar platoon of the machine-gun company there are four 50-mm mortars and, finally, in the anti-tank rifle platoon of this company there are four Belgian 37-mm guns. The infantry battalion has a total strength of 600 to 900 men.

In addition to three infantry companies and the machine-gun company the battalion has a signal platoon, pioneer platoon and train. The signal platoon consists of three telephone squads of four men each (three telephone operators and a squad leader). There is also a radio section, consisting of three three-man

squads. As a rule, machine-gun companies employ radio. Due to shortage of wire the telephone line is single circuit.

In addition to three infantry and one reserve battalion the regiment has a number of specialist units. The regiment has a machine-gun company of about 100 men, divided into four four-squad platoons. The mortar company has light 81-mm mortars. The anti-tank gun company has eight 31-mm or 75-mm anti-tank guns.

The Hungarian division consists of three infantry and one artillery regiments. As independent units there should be noted the battery automatic anti-aircraft guns, anti-aircraft machine-gun company, cavalry troop, and signal company. The artillery regiment within the division consists of two battalions. Each battalion has three four-gun batteries. The first battery—75-mm guns, second battery—105-mm guns or howitzers and third battery—150-mm guns or howitzers. All guns are horse drawn.

The army corps consists of three divisions, but actually we meet corps consisting of two divisions, while the third division is either kept in reserve or is being formed.

(Krasnaya Zvezda)



MILITARY NOTES AROUND THE WORLD



AUSTRALIA

Australian Beauforts Make Record:

Two years after blueprints were first available, Australian Beaufort Bombers, a modified version of the Bristol Beaufort, have been in action and sunk Japanese ships in the southwest Pacific area. No torpedo bomber has been built from blueprint to complete aircraft in so short a time anywhere in the world, Australian engineers claim. The 1200 horse-power Pratt and Whitney engines with which the planes are powered are built in a factory which in July 1940 was open country, and in which the first engine was tested in September 1941.

(Australia)

Tanks Are World's Fastest For Weight:

Australian designed tanks which passed acceptance tests early in February are claimed to be the fastest tanks of their weight in the world. They are now in quantity production in New South Wales. They are said to have one of the lowest silhouettes of any modern tank, and to be the first tanks powered with multiple gasoline engines, as well as the first with complete armored steel hull cast as one unit. Mass production has been achieved 12 months after approval of the design. Munitions Department officials say the tank combines the automotive characteristics of American tanks with the fighting qualities of British tanks. Munitions Minister Norman Makin announced early in February that the Commonwealth Ordnance Factory is now making 250-lb. armor-piercing bombs, and has reached quantity production of the Bofors antiaircraft gun.

(Australia)

CHILE

Coastal Defenses:

Four coastal batteries ordered by Chile from the United States were delivered a few months ago. Along with them Chile also gets, for a short time, trainers for their crews.

(Frankfurter Zeitung)

CHINA

Armament of the Chinese Army:

Up to 1939 weapons were brought into China from the larger arms plants of the entire world as there was practically no arms industry in existence there. Machine guns were furnished by Neuhausen (Switzerland), AT cannon were by Soviet Russia, mortars came from France and cannon were sold to China by Bofors of Sweden, to mention only a few.

After 1939, armament was imported almost exclusively from England (Bren machine guns among other things) and the United States. Since it was imprac-

tical to get replacement parts from other countries, much equipment went out of service. Only mortars of which many of 50, 80 and 120 millimeters have been captured by the Japanese, have proven of much value. These mortars are apparently made in China itself and form the larger part of their heavy armament. Also considerable numbers of 76.2-mm mountain cannon with a range of about four miles have been encountered.

(Deutsche Wehr)

Strength Of Chinese Army:

The army at the front consists of about 300 divisions, with 5 million well armed. Back of them are 15 million reserves whose training is not yet finished or who started training but a few weeks ago. In addition to this, there are 800,000 men who have received excellent training for guerrilla warfare and a special formation of 600,000 men who, as in Soviet Russia, cooperate with the guerrilla fighters. The equipment of the troops with modern arms is a different problem.

(Relazioni Internazionali)

GERMANY

New Heinkel Aircraft:

A civilian version of the Heinkel He-177 is being built in France. It has four 2,000 h.p. BMW 802 radial motors, and a four-wheel undercarriage.

(The Aeroplane)

GREAT BRITAIN

AA Defense:

According to an article in *Ali di Guerra* of 10 September 1942, English AA cruisers possess ten, 102-mm AA cannon, sixteen 40-mm eight-barreled AA cannon, eight 40-mm four-barreled AA cannon and a large number of AA machine guns up to 20-mm caliber. Ordinary merchant ships have 40-mm AA cannon with six or eight barrels. These multiple-barrel weapons are Vickers guns which fire a projectile weighing 1 kg. (about 2 1/2 lb.) automatically. The barrels have funnel-shaped muzzle brakes.

In the English Channel, when the weather is favorable, kites or balloons anchored by steel cables are released. These kite or balloon barricades, are towed by the convoy boats. Low-flying torpedo planes are warded off by barrage fire during which the 38.1-mm projectiles of the ships' artillery, on striking the surface of the sea, send up columns of water to a height of 300 feet, against which the torpedo planes may run as a barricade.

(Militär-Wochenblatt)

Coast Artillery:

In addition to various types of coastal

guns with the calibers of the English railway guns (234-mm, 304.8-mm, 355-mm, and 457-mm) there is also in the coast artillery an especially large gun of 534-mm (21 inches) which, according to "Wehrtechnische Monatshefte" with its 2500 kilogram shell (5,500 lbs.) possesses a maximum range of 16,000 meters (about 10 miles). It is the largest caliber gun in the world, followed next by the French 520-mm railway howitzer.

(Artilleristische Rundschau)

Planes Armed With Cannon:

Of the four new planes which recently were introduced, the single seat Hawker Tornado pursuit plane which possesses the unusually high speed of 680 km. (about 400 miles) per hour, and is especially heavily armed. In addition to eight machine guns, it is also equipped with three 20-mm cannon. As "Corriere Della Sera" indicates, this armament is twice as strong as that of the British Spitfire.

The new, two-motored general purpose Blackburn "Botha," recently added to the British Air Forces by the Coast Command for use in armed reconnaissance and dropping torpedos, is armed with an airplane cannon which, according to "Deutsche Wehr," is placed in a glass-covered, revolving turret on the fuselage back of the wings. It is also assumed that the plane is armed in addition with one or two machine guns.

According to "Vie dell'Aria," the new "Typhoon" pursuit plane is also armed with a cannon.

(Artilleristische Rundschau)

ITALY

Italian Armed Forces:

The following units have been included in the Italian fighting forces: the mobile units of the AA defense and the coast guard, the large mobile formations provided for coast defense, the mobile troops located in southern France, Corsica and French North Africa, and the mobile troops located in Albania.

(Militär-Wochenblatt)

JAPAN

Activities In The Dutch East Indies:

According to Japanese reports, the establishments in the Dutch East Indies for the construction and repair of ships and which play an important role both from the financial standpoint and the point of view of shipping, have come into possession of the Japanese. The shipyards in Surabaya which belong to the "Soerabaya Droosdok Mij", have been acquired by the Kavasam ship yards while the "Mij Tandjong Priok" in Batavia, has gone into the hands of the Hariman yards. Nothing has been learned regarding the conditions of the change in

ownership. Both establishments, of which the ship yards at Surabaia has 2 million gulden and the Tandjong Priok yards 1 million gulden in joint stock, are built in a modern manner and yield very considerable financial returns.

(Militär-Wochenblatt)

First Train Through Under-sea Tunnel:

After six years of work and the participation of three million laborers, the first passenger train traveled through the Kwangmon under-sea tunnel which joins the Japanese mainland with the island of Kyushiu. The passing of this train through the tunnel marked the opening of regular service over this important connecting route. The building of the tunnel was planned as far back as 1897 but it was not until the year 1918 that the plans assumed concrete form, when the Parliament ratified the project. Not until 1928 was it possible to begin the geological researches after the construction committee had been organized in July 1925 at the instigation of the then minister of war, Arrui. The tunnelling began in November 1936 at Moji and during the latter part of January 1937, at Shimonoseki. The cost of construction totalled 50 million yen.

(Militär-Wochenblatt)

Singapore's Harbor Installations Again In Operation:

Some three kilometers (about two miles) of piers are already repaired to the point where some twenty boats of up to 10,000 tons may be loaded or unloaded at the same time. The great Empire floating dock as well as the majority of the other dock installations are again ready for use. A floating crane of several hundred tons capacity has been brought from Japan to Shonanto and is to be used in raising many boats sunk by the English. These will then be repaired in the shipyards. Several of the floating cranes sunk by the English, have also been raised and will be employed. Also the important recoiling equipment had been placed in operation again. Half of the oil and gas tanks wrecked by the British on the Island of Brakamati are again ready for use and a considerable number of storage sheds have also been made temporarily usable.

(Wehrwirtschaftliche Nachrichten)

MANCHUKUO

Building Up the Armed Forces:

The building up of the armed forces is going forward in close cooperation with the Japanese Kwantung army. An air force, an air defense corps and motorized formations have been created. Since the frontiers partly consist of rivers, special river formations have been organized. The strength of the army which had its origin in 1934, has been steadily increasing as a result of the universal military service which was instituted in 1904. The Japanese Kwantung Army supplies officers as instructors. In the way of schools, there are among others, a military academy, also military, aviation, motor vehicle and medical officers' schools.

(Deutsche Allgemeine Zeitung)

PORTUGAL

Mountain Artillery:

The Mountain Artillery is getting Italian 75-mm M 34 mountain howitzers which are proving highly effective. A 46-mm trench mortar which has been in-

troduced into the Portuguese army, is built with a fixed angle of elevation. The variations of range are obtained by changing the gas pressure. A cylinder located underneath the barrel serves the purpose of pressure regulator.

(Militär-Wochenblatt)

SWEDEN

The Swedish Army:

With the inception of the five-year plan for rearmament on 1 July 1942, changes were made which affected some of the higher officers. The position of commander-in-chief of the armed forces which hitherto had not existed in time of peace but only provisionally since December 1939, will now be also a peace time office and General Thoernell, former chief of staff has been appointed to the post. Major-General Bredberg, former inspector of horse-drawn supply column troops, was appointed as new chief of the general staff. The new position of army inspector has been created, in addition to the positions occupied by the chiefs of the three branches of the armed forces, and its particular duties defined, especially with reference to training and instruction. Numerous changes were also made in the inspectorates of the separate arms. The former division of the country has been changed and it now consists of seven military districts with commanders and lieutenant-commanders.

(Frankfurter Zeitung)

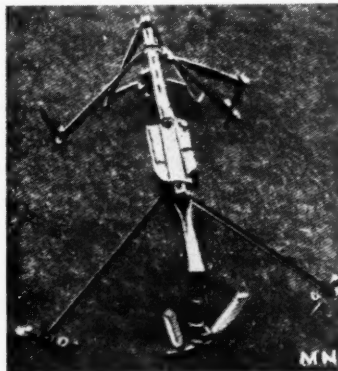
SWITZERLAND

Construction Of An Apparatus For Firing A Machine Gun In The Dark And Fog:

Length of time required for installation in accordance with illustrations about 15 minutes. The front support is



anchored some 10 to 15 centimeters in the ground. The rear support is anchored by means of two wooden pegs in a



little hollow in the ground. It is further supported by steel braces running backward and to the side and the use of bayo-

nets. The weapon when braced in this manner produces well aimed fire against invisible targets.

(Militär-Wochenblatt)

Physical Training In The Swiss Army:

Gymnasium work, sports and contests are carried on in a systematic manner particularly during free periods. Good units may as a reward, engage in sports even during regular duty periods. These activities are, however, only means towards the end, which is military development and training. The committee in charge of contests in the army was also given charge over gymnasium and sports events. It forms a permanent office in charge of "physical training in the army". Generally speaking, troops may train for the sports emblem during free periods. A soldier with good record may train for this during regular working periods. Every unit must conduct contests. A suitable officer is appointed with the title of "sports officer" with each unit and prepared for his duties in a six days' course. Men are also placed in charge of sports in all troop units and assist the commanders in both an advisory and practical way in all questions relating to physical exercise.

Both sports officers and men in charge carry on their activities as extra duties and are at the same time troop commanders. A trained body for physical culture is to be formed by a several weeks' course in gymnasium work, light athletics and swimming. It is attended also by the sports physicians who are appointed for duty throughout the entire army. Their duties consist of supervision of the health of the men engaged in sports activities. As soon as this instructional body has been created the men in charge of sports are called in to attend a course. Recruits may not compete for the sports emblem as they already have too full a schedule.

(Allgemeine Schweizerische Militär-Zeitung)

Supervision Of Press:

The supervision of the press which has formerly been carried on by the army has been taken over by the Council of State itself. Beginning with 1 February, the duties of the Press and Radio Division hitherto handled by the army headquarters will be handled by the Council of State. A decree has also been issued with respect to supervision of political, military and economic publications other than newspapers. Their authors must submit them to the Press and Radio, Division which, under certain conditions, may censure them.

(Frankfurter Zeitung)

TURKEY

Extension of Railroads:

The national assembly has voted a special credit of 100,000 Turkish pounds for the development of the Black Sea port of Ereğli. Ereğli is next to Zonguldak in the shipment of coal from the Zonguldak area, and the importance of this port will also increase with the completion of the Zonguldak-Ereğli railway which can be counted on toward the end of the present year. A new railway line is being built at the present time between the two coal shipping ports, Kozlu and Zonguldak, on the Black Sea. The line, which is 4.5 kilometers (about 2.6 miles) in length, traverses an exceptionally difficult terrain. A tunnel, 261 meters in length (about 285 yds.) is already finished, while work is still in progress on

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another tunnel 1350 meters in length (about 1476 yds.). A further extension of this line to Eregli is planned in order to connect this port with central Anatolia and Istanbul. The work was scheduled to be finished in the winter of 1942-43.

(Militär-Wochenblatt)

Turkish Artillery:

Turkey's modern artillery equipment comes from Skoda and Vickers. The Skoda 150-mm L/24 field howitzer is horse-drawn in two loads. Each vehicle weighs 3400 kg. (about 7,480 lbs.). A range of 15 km (a little under 9½ miles) is obtained with a projectile weighing 42 kg. (about 92.4 lbs.). It makes use of five different charges with muzzle velocities between 300 and 570 meters per second (about 984 and 1870 ft. respectively). Weight in fire readiness 5000 kg. (about 11,000 lbs.).

The 100-mm Skoda mountain cannon has a range of 9 km (about 5½ miles) with a projectile weighing 14 kg. (about 26.4 lbs.). It is transported knocked down into three loads: tube, cradle with gun shield, and mount.

(Militär-Wochenblatt)

UNITED STATES

Most Powerful Dive-Bomber:

So much has been written about the German Stukas that many have come to believe that the Germans not only invented dive-bombing, but that they excel at this effective fighting method. As a matter of fact, the American Navy originated dive-bombing and our dive bombers are superior to anything built anywhere in this class of aircraft.

The latest, most powerful, and most ominous dive bomber is the Curtiss-Wright XSB2C-1, which is a midwing design and which carries two men for its crew. Military necessity prevents much information being revealed, but we are glad to learn that the machine will be faster, will have a greater range, and will carry a greater load of bombs than any other craft of its type in the world. It is powered with a 1700-horsepower Wright Cyclone engine, the wings have fixed of movable slots at the tips, and three-bladed controllable pitch propeller will absorb the power of the Cyclone.

(Scientific American)

Army and Navy to Designate Warplanes By Popular Names:

So that the general public may have a better idea of the character of military aircraft and more readily identify them, every American warplane—bomber, fighter, transport, trainer or other type—will hereafter have a name of its own instead of being a mere bomber. In adopting this policy, the Army and Navy will follow a practice which has long been in effect in England and which has made certain plane names household words throughout the world.

Many American combat planes are already widely known by particular name, but certain minor changes have been made, as in the case of the Curtiss P-40 series of fighters, models of which have been known as the "Tomahawk," "Kittyhawk" and "Warhawk," but which hereafter will be known only as the "Warhawk." The new names of the U. S. combat planes, together with the old letter-numeral designations and the companies manufacturing them are the following:

Army	Navy and Marine Corps	Manufacturer	Name
HEAVY BOMBERS			
B-17		Boeing	Flying Fortress
B-24	PB4Y	Consolidated	Liberator
MEDIUM BOMBERS			
B-18		Douglas	Bolo
B-23		Douglas	Dragon
B-25	PBJ	North American	Mitchell
B-26		Martin	Marauder
B-34	PV	Vega	Ventura
LIGHT BOMBERS			
A-20	BD	Douglas	Havoc (Attack)
A-24	SBD	Douglas	Dauntless (Dive)
A-25	SB2C	Curtiss	Helldiver (Dive)
A-29	PBO	Lockheed	Hudson (Patrol)
A-34	SB2A	Brewster	Buccaneer (Dive)
A-35		Vultee	Vengeance (Dive)
	SB2U	Vought-Sikorsky	Vindicator (Dive)
	TBD	Douglas	Devastator (Torpedo)
	TBF	Grumman	Avenger (Torpedo)
PATROL BOMBERS (FLYING BOATS)			
OA-10	PBY	Consolidated	Catalina
	PB2Y	Consolidated	Coronado
	PBM	Martin	Mariner
FIGHTERS			
P-38		Lockheed	Lightning
P-39		Bell	Airacobra
P-40		Curtiss	Warhawk
P-43		Republic	Lancer
P-47		Republic	Thunderbolt
P-51		North American	Mustang
	F2A	Brewster	Buffalo
	F4F	Grumman	Wildcat
	F4U	Vought-Sikorsky	Corsair
SCOUTING OBSERVATION (SEAPLANES)			
	SO3C	Curtiss	Seagull
	OS2U	Vought-Sikorsky	Kingfisher
TRANSPORTS			
C-43	GB	Beech	Traveler
C-45A	JRB	Beech	Voyager
C-46	R5C	Curtiss	Commando
C-47	R4D1	Douglas	Skytrain
C-53	R4D3	Douglas	Skytrooper
C-54	R5D	Douglas	Skymaster
C-56	R50	Lockheed	Lodestar
C-61	GK	Fairchild	Forwarder
C-69		Lockheed	Constellation
C-76		Curtiss	Caravan
C-87		Consolidated	Liberator Express
	JR2S	Vought-Sikorsky	Excaltibur
	JR2S	Vought-Sikorsky	Excaltibur
TRAINERS			
PT-13&17	N2Si&3	Boeing	Caydet
PT-19&23		Fairchild	Cornell
PT-22	NR	Ryan	Recruit
	N2T	Timm	Tutor
BT-13&15	SNV	Vultee	Valiant
AT-6	SNJ	North American	Texan
AT-7	SNB2	Beech	Navigator
AT-8&17		Cessna	Bobcat
AT-10		Beech	Wichita
AT-11	SNB1	Beech	Kansas
AT-13&14		Fairchild	Yankee Doodle
AT-15		Boeing	Crewmaker
AT-19		Vultee	Reliant
	SNC	Curtiss	Falcon
LIAISON			
L-1		Vultee	Vigilant
L-2		Taylorcraft	Grasshopper
L-3		Aeronca	Grasshopper
L-4	NE (Navy Trainer)	Piper	Grasshopper

(The Army Navy Courier)

MILITARY NOTES AROUND THE WORLD

Cost of War:

The United States will be spending one hundred billions of dollars for war costs for the fiscal year beginning July 1, 1943. The relative outlays of other belligerents, both our Allies and enemies, are shown in the chart below:



(The New York Times)

U. S. S. R.

Employment Of Invalid War Veterans

Special courses for invalid officers, wounded during the present war, have been opened in Chita, Siberia. The invalids are trained to become judges, notaries and other public officials.

(Izvestia)

Powder and Explosives Industry:

Many powder and explosive plants are located in and around Leningrad. There is a powder and explosives works east of Leningrad, at Schluselburg on Lake Ladoga. Explosives are also manufactured by the "Krasnyi Chimik" as well as by the "Chemiekombinat" in Okhta. ("Kombinate" are large industries covering several stages of manufacture.) The latter,

according to "The Journal of the Gun Powder and Explosives Industry", also manufactures many other products such as nitric acid, synthetic methanol, carbon disulphide by a retort process, celluloid, etc. Ammunition is manufactured by the Kirov works, the former Putilov works, located in Leningrad proper, likewise by an ammunition factory in Klopina close to Leningrad.

Also in the Moscow district which is important in the production of chemicals on account of its proximity to coal fields, there are explosives and acetylene works according to "Wirtschaftsring". Also, according to "Militär-Wochenblatt" there are ammunition works in the Dniepr bend (now under German occupation, Ed.)

(Artilleristische Rundschau)

Russian Armored Trains:

Some of the Russian armored trains encountered by the Germans are made up of eight cars, half of them armored. The main combat strength lies in 127-mm or 76.2-mm cannon which are reported to be "quite effective." In addition there are several other lighter guns and machine guns. The cars are connected with one another by a telephone system, and there is also radio equipment which keeps the train in communication with the outside world.

(Die Panzertruppe)

Russian AA Materiel:

Quadruple machine guns are used for AA defense. Four machine guns of 7.62-mm caliber (Maxim model) are coupled together on a pivoted base. They are fed from cartridge boxes each containing 250 rounds. Sighting is by means of a "float-

ing" circular front sight. Rate of fire, 2000 rounds per minute; maximum range, 1000 meters (about 3,300 feet) height. Transportation by truck.

The special heavy Hotchkiss machine gun is replaced by the 12.7-mm Degty are machine gun on wheeled mount. It is a gas operated weapon gun with muzzle brake, articulated metal band for feeding cartridges and an effective range of 1500 meters (about 5,000 feet) height.

The 37-mm Model 39 AA cannon is constructed as a four-wheeled trailer with outrigger gun platform and is effective up to a height of 3000 meters (about 10,000 feet) with a shell weighing 0.72 kg. (about 1 lb.)

The 76.2-mm AA cannon, (L/50) is also built as a four-wheeled trailer with outrigger gun platform, likewise with complete traverse and elevation up to 80 degrees. The tube, equipped with muzzle brake, fires a shell of 6.5 kg. (about 4 lbs.) to a vertical height of 9.5 kilometers (about 6 miles).

An 85-mm AA gun is also used by the Russians.

(Militär-Wochenblatt)

Russian Artillery:

The 122-mm M 31 cannon has a tube with a length of 46.3 calibers (L/46.3, equal to 18.5 ft.). Its elevation range is from minus 4 to plus 45 degrees and its traverse range, 56 degrees. The projectiles weigh 25 kg (about 55 lbs.) and with a maximum muzzle velocity of 800 meters (about 2624 ft.) per second, attain a range of 21,000 meters (about 3,280 yds.). In firing position the gun weighs 7100 kg. in readiness for moving, 7,800 kg (about 15,620 and 17,160 lbs. respectively.)

(Militär-Wochenblatt)

RATIO OF MEDICAL OFFICERS TO MEN IN THE ARMED FORCES

Doctors per thousand men



GERMANY 3.0



GREAT BRITAIN 3.4



UNITED STATES 7.2

Sources: Germany—Surgeon General Thomas A. Parran, before the Conference of State Medical Secretaries and Editors, November 20, 1942; Great Britain—Dr. Morris Fishbein, before the American Pharmaceutical Manufacturers Association, December 8, 1942; United States—Dr. Frank Lahey, before the Senate Subcommittee on Manpower, November 2, 1942. U.S. figures refer to the army only.

M

(Medical Economics)

FOREIGN MILITARY DIGESTS

Digests of articles from foreign military periodicals. Other items of interest from foreign publications are indicated in the Catalog of Selected Periodical Articles.

Crossings On Ice

[Written by Colonel S. Bernshtein, Soviet Army. Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from the Russian in *Krasnaya Zvezda* 11 December 1942.]

Transporting heavy loads across ice is a relatively new problem. Consequently it is not to be wondered at that the role of ice under heavy loading is not correctly understood and that crossings are not organized as they should be. But a layer of ice possesses a relatively high degree of stability and may insure uninterrupted use for crossings during a long period of time if properly exploited.

The carrying ability of ice, that is, the size of the limit load it can sustain, depends on three factors: the structure of the ice, its thickness, and the dimensions of the base surface of the load. If the structure of the ice is normal and its thickness is sufficient for the passage of the given load, then the crossing is made directly on the ice. But if the thickness of the ice is not sufficient or if its structure is different from normal, it is necessary to strengthen the crossing. For this purpose there are three basic methods which are familiar to our engineer troops. It would not be necessary to mention them except for a number of mistakes committed fairly frequently and nullifying the work of strengthening the crossings.

Let us enumerate these methods in the order of increasing labor involved in the work: 1. freezing-on another layer and the construction of an ice bridge; 2. laying a superstructure on the ice; 3. constructing a pile-and-ice bridge. The increase in labor is expressed in time, which is precious in the combat situation. Therefore each successive method is to be employed only if the preceding one is inapplicable. But it is just this condition which is frequently violated without sufficient reason, and the consequences of an incorrect decision may be serious.

Once last winter in the course of an attack it was necessary for some tanks to force a river near their point of departure. The start of the crossing was set for the early hours before daybreak, so that the tanks might get across the river in the dark and have possession of a base on the opposite shore by morning. The ice was thick enough, but the unfrozen areas on the fairway misled the sappers, and they decided to construct a pile-and-ice bridge, that is, they straightway chose the most involved method of reinforcement. The sappers did not succeed in erecting the bridge during darkness, and the tanks had to begin the crossing in the morning. As a result, several vehicles were disabled at the crossing, a concealed maneuver became impossible, and the operations of the tanks suffered a de-

feat. In this case the sappers should have built only an ice bridge on the open water, which takes little time.

Freezing-on a layer and the construction of an ice bridge are different operations sharing two general characteristics. First, they do not require the use of any building materials, and second, they disturb the thermal equilibrium of the ice layer. The technique of freezing-on a layer is well known. We shall deal only with the ways of decreasing the effect of the disturbance of thermal equilibrium.

The thickness of the ice on a river at a given moment is not an accidental matter. It is determined by the fact that between the surface air and the water under the ice a thermal equilibrium has been established. If the temperature of the air is lowered, then the thermal radiation of the water increases, the water cools, and the ice increases downward until equilibrium is re-established. When the temperature of the air rises, the opposite process takes place, and the ice thaws underneath until equilibrium is reached. Thus the ice plays the role of a self-regulating covering.

If the thickness of the ice is artificially increased above, that is, if the covering is protected, the water begins to get warm, and the ice will melt from below. After two or three days it reaches its former thickness, and the effect of reinforcement has disappeared. More than that: the ice loses its firmest, lower layers, which are not compensated for by the upper artificial ice, usually less solid. For this reason the ice will be weaker two or three days after treatment than it was before. Hence it follows that reinforcement by freezing-on a layer is a short-time measure. It is appropriate for the completion of a single operation, but it is not suitable for prolonged use of a crossing.

The period of effectiveness of this method increases if it coincides with the cooling of the atmosphere, and diminishes at a time of gradual warming up. At a temperature near the melting point, freezing-on a layer is useless. Hence the conclusion: freezing-on a layer should be effected only in cold weather (below -10° Centigrade: $+15^{\circ}$ Fahrenheit) and is best at the start of a cold wave. It is better to operate at night. We may mention one other means of increasing the effectiveness of this technique: the clearing of snow from strips of ice on both sides of the route. The reason is that snow insulates from ten to thirty times as well as

does ice; that is, its protection is that much greater. Clearing the snow away removes this additional covering, increases the thermal radiation of the water, and leads to a thickening of the ice, which somewhat compensates for the disturbance to the thermal equilibrium resulting from the addition of the layer. Clearing the snow is recommended for all ice crossings in general inasmuch as it automatically thickens the ice. We observed such a thickening of the ice at a long-established crossing on the Volga: toward the end of the winter, the ice covered by snow was eighty centimeters (32 inches) thick, and in the cleared places, 110 to 115 centimeters (about 43 to 45 inches).

The construction of an ice bridge is accomplished in order to cover natural or artificial open spaces of water. For this purpose a whole pan of ice is sawed out near the open area but at a distance from the route. In length it must be equal to the breadth of open water to be covered and in width not less than thirty times the thickness of the ice. This pan is floated to the open stretch, fastened in place and frozen in by filling the joints with snow or chopped ice and pouring on water. Obviously it is useful to join the solid ice and the bridge with wires. As we see, the name "ice bridge" is inaccurate, because the ice pan covering the open water is afloat; it would be more correct to call it an "ice raft."

Laying a superstructure on the ice is necessary only when freezing-on a layer is impossible, that is when the temperature of the air is higher than -10° Centigrade ($+15^{\circ}$ Fahrenheit) or when there is a tendency to a rise in temperature. The road is usually constructed of wood: cross-beams are laid, and on them the stringers; the road surface is fastened to the latter. In constructing this device an error is often made which deprives it of strength and sometimes even weakens the ice. This mistake is that the weight of the superstructure itself is forgotten and too much wood is piled on the ice. It must be remembered that the superstructure burdens with its own weight the floating ice sheet which supports not only the useful load but also the road materials. Although the superstructure decreases the distortion of the ice by distributing the weight of the useful load, the strain on the ice is increased by the actual weight of the crossbeams, stringers, and roadway. The superstructure is of advantage only when the total strain at any point is less than would be the case if the useful load alone were placed directly on the ice.

How can the ice be strengthened by means of a superstructure with certainty of stability? First of all it is essential that the superstructure be light. Its own weight must not exceed 600 to 800 kilograms per meter of length (1400 to 1900

pounds per yard). Second, it must be borne in mind that the most important element of the superstructure is not the stringers but the crossbeams, and therefore it is important to pay particular attention to them.

The use of composite stringers of eight, twelve, and even sixteen joists, as recommended by some, is not advantageous but actually harmful. On the other hand, the crossbeams should be laid close together; it is not bad practice to lay them side by side. Long crossbeams are of no special use; the ends projecting beyond the edge of the stringers should not be more than half a meter (1 ½ feet) long. With greater exposed length the ends of the crossbeams will lift under load. Experience shows that it is best to lay short crossbeams (2 to 2½ meters: 6½ to 8 feet) under each line of traffic separately. Railroad ties can be used for this. (Note: Russian gauge is greater than U. S. gauge. Ed.) The crossbeams should be bedded on snow, but not frozen in. On them it is sufficient to lay longitudinal planking 0.8 to 1.2 meters (30 to 47 inches) wide and 0.10 to 0.15 meters (4 to 6 inches) in thickness: 5-centimeter (2-inch) planks in two or three layers.

If a superstructure of such type does not weigh more than indicated above, the carrying ability of the ice may be considered as having been increased by forty percent. This device cannot have any greater effectiveness. As we see, it is possible to attain greater reinforcement of the ice by means of freezing-on a layer, but then only for a short time, whereas the crossing with superstructure is able to function a long while.

A pile-and-ice bridge or other permanent construction not using the natural buoyancy of the ice should be employed only in those cases where the ice is so thin and weak in structure (spring ice, sheet ice) that no other means of reinforcement can secure the necessary carrying ability for the crossing, or when the latter is designed for prolonged use and carries a regular and considerable flow of heavy traffic.

From what has been said it is evident that for the commander who is accomplishing the construction of the crossing, the important thing is to make the correct decision. It is based on the data of engineering reconnaissance, which must be carried out with particular care and exactness.

Artillery in Combat on the Streets of Stalingrad

[An article by L. Visokoostrovski in *Krasnaya Zvezda* 9 December 1942. Translated from the Russian at the Command and General Staff School, Fort Leavenworth, Kansas.]

In the fighting now going on in the outskirts of Stalingrad, our artillery, as before, is playing a prominent part. Along the whole defense of the city in the course of more than three months it barred the way against the enemy with its intensive and accurate fire, which was supplemented by other types of weapons. Now, since our troops have assumed the offensive, the importance of artillery support for infantry has greatly increased.

The enemy built fortifications in the streets. He converted buildings into control posts, surrounding them with dugouts and permanent log and earth fortifications. Parks, vacant lots, and squares were covered with barbed wire, mine fields, and antitank obstacles. Every stone wall was a bastion with embrasures. It was possible to demolish and overcome all this only with the help of the artillery battering-ram. But this task could not be accomplished at one swoop or in one round.

The trouble was that the positions of the contending armies were in close contact. It was possible to find many areas where the Red Army soldiers and the Germans occupied trenches not more than ten paces apart. It is obvious that the task of the artillery battalions and regiments was difficult in the extreme. They could strike at the German rear and communications, but they did not always succeed in destroying the centers of hostile resistance along the forward edge by means of massed fire attack. To attempt this involved the risk of hitting our own troops.

The support of infantry attack in the city is furnished mainly by individual batteries and guns, which accompany the riflemen not only with fire, but also on wheels. The gunners follow the infantry and fire point-blank. Very often the infantry themselves pull the guns along, helping the artillerymen. Even small groups of soldiers with limited missions

take a gun along, and this is fully justified.

Several days ago a unit of automatic riflemen was ordered to take a dugout from which the Germans were firing on our positions with machine guns. It was not expedient to take the machine-gun nest by storm, as that would have resulted in heavy losses. Consequently the automatic riflemen took along a small gun under the command of Sergeant Agapov.

The artillerymen chose a position from which it was easy to aim point-blank at the dugout. The automatic riflemen studied the ways of approach to the machine-gun nest from a short distance, whence it was easy to begin the attack. After this the automatic riflemen crawled forward and, under strong fire, they took all the openings of the dugout. The

Fascists ceased firing. Then the artillerymen rolled the piece out to an open firing position and fired a determined number of rounds. Chips flew from the dugout. The automatic riflemen shot the fleeing Hitlerites on the move and occupied the dugout. The gun covered them from fire action from other fortifications of the enemy.

This incident is characteristic for many other engagements taking place recently in the city. Light cannon, used at point-blank range, very effectively aid in gnawing through the solid defense of the Fascists. Experience in the use of individual pieces in street battles is being diligently acquired in all regiments. In this connection we do not disdain to use also some tricks employed by the enemy in maneuvering on wheels in open regions. The main thing in the tactics of the gunners when operating independently is not to stay long in one place, to move rapidly from one dangerous place to another, and at the critical moment to advance the piece resolutely.

If in clear weather it is difficult to move out for point-blank fire, this is comparatively easy to do in conditions of limited visibility, if the movements are well prepared. During the night, Krivonozhka, the leader of an antitank squad, moved his guns to open firing positions about eighty meters (eighty-eight yards) from the forward edge of the German defense. During the day he had tentatively determined where the enemy's machine-gun nests might be, had measured the distance to them, and had prepared the data for firing. The gunners fired by flares, and the results were completely satisfactory. One gun alone destroyed three permanent log and earth fortifications and a light machine gun. Toward morning the hostile fortifications were taken by our infantry without much opposition from the Germans. At dawn the antitank squad was again in concealment.

Our infantrymen and artillerymen fighting in Stalingrad have come to understand each other very well. Cooperating closely, they gouge their way into the defense of the enemy and step by step are forcing the Fascists out to the west. Losing their strong points on the forward edge, the Germans are hurriedly erecting new ones in depth, but from time to time the fire of our division and long-range batteries strikes them here. The Soviet artillery attacks side by side with the infantry.

Self-Propelled Gun Mounts

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Militär-Wochenblatt* 2 October 1942.]

When guns are mounted on motor vehicles for firing from the vehicles, such an arrangement is called a self-propelled mount.

Even before the last World War there were to be found AA cannon mounted in motor vehicles. After the World War the Reich possessed cannon mounted in motor vehicles. France tried to give mobility to medium and heavy cannon by mounting them on self-propelled mounts with caterpillar treads. The mount was equipped with an electric motor which obtained its current from a generator car ahead. Hence, it is virtually only the head car that is self-propelled. This sort of mount (France had them in use in 1940; the

Italians have something similar) is, therefore, not considered.

The Americans employed the Christie construction in order to get a self-propelled mount. This type was, however, no more successful than the arrangement of 75-mm cannon or 203-mm howitzers on unarmored, self-propelled mounts with caterpillar treads.

The English had 83.8-mm field guns, at first protected from rifle fire only by a weak gun shield, mounted on the chassis of the Mark II. A further development is represented by the arrangement where the gun is protected by armor. This self-propelled mount (Fig. 1) weighed 12 tons, attained a speed of 25 kilometers

(about 15 miles) per hour and was able to carry a 6-man crew and about 1700 lbs of ammunition. The gun had unlimited traverse. It was, however, never made a part of the regular troop equipment.

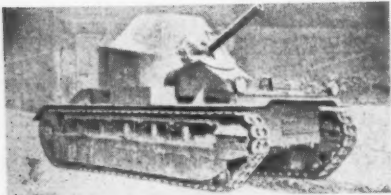


FIGURE 1.

About three years ago, an AT cannon protected by armor was mounted on the chassis of the Vickers VI-b light tank and was put into the field for a tryout with the armed forces. The results were not satisfactory.

The French designed self-propelled mounts for 75, 105, and 155 millimeter cannon but manufactured only a few of them. These mounts, made by Saint Chamond, were armored and were able to travel either on wheels or caterpillar treads. However, they were not popular in the French army.

The self-propelled mount attained more importance in Belgium. At first the chassis of the little Carden-Lloyd tank was arranged to take a 50-mm cannon (see Fig. 2) but it was mounted too low on the chassis. In the campaign on the western front in 1940, Belgium employed the chassis of the 6-ton Vickers-Carden-Lloyd tank with a 50-mm cannon as a self-propelled gun. This model T-13 self-pro-

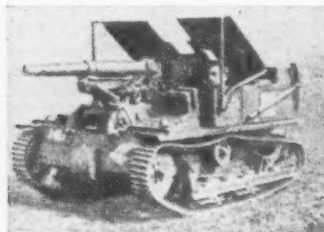


FIGURE 2.

pelled mount had armor with a thickness of 8 centimeters and was intended for antitank service. At the present time, the English are loading their Vickers 2-pound 40-mm AT gun on a standard commercial truck (see Fig. 3). But with this arrangement they are forced to confine the main direction of their fire to the rear.



FIGURE 3.

The development of anti-aircraft artillery gave special impetus to the construction of self-propelled mounts. France set the Schneider L/37 75-mm AA cannon on a four-wheeled truck (Fig. 4) which had to be blocked underneath when the gun was fired. The vehicle and gun weighs about 14,000 lbs.

The Italians still use today the 75-mm L/27 AA cannon mounted in a truck



FIGURE 4.

(Fig. 5) in which also, before firing, the load has to be taken off the springs by means of out-riggers. However, at the present time in foreign countries the view prevails that the unarmored self-propelled mount for use in AA defense is not suited for the 75-mm caliber. Italy has truly modern equipment in her Model 33 75-mm AA cannon (a two-wheeled towed gun with limber). France, shortly before the beginning of the present war, introduced a Schneider 75-mm L/49 AA cannon on a two-wheeled transporting carriage. The Russians, too, are no longer using their 76.2-mm AA cannon on six-wheeled trucks, but are mounting them on four-wheeled towed mounts.

The use of 20-mm AA weapons mounted in a practical manner on pedestal mounts permitting full lateral play, is very common in other countries. Field guns on self-propelled mounts have been tried out in Italy. These mounts run either on wheels or on caterpillar treads as desired, and their speed with wheels is 80 km (about 50 miles) per hour and on the caterpillar tread, 40 km (about 25 miles) per hour. We have no additional information regarding the tests which have been going on for over two years. It appears to be difficult to solve the constructional problems relative to the complicated method of propulsion in combination with the problems relating to the gun.

The self-propelled mount, L/62, manufactured by Landsverk of Sweden, a carriage with a 47-mm AT cannon employing a caterpillar tread, should be mentioned. The 200 horsepower motor gives the 8.5-ton mount, which is 13 feet in length, 7 feet in breadth and 6 feet in height, a maximum speed of 48 km (about 30 miles) per hour. The armor is from 10 to 13 millimeters in thickness. The mount pulls a two-wheeled trailer for ammunition so that it is possible to carry a total of 300 shells.

Earlier, the Russians had 76.2-mm cannon mounted on trucks capable of traveling over any terrain. However, the use of this self-propelled artillery in this campaign has not come to our attention.

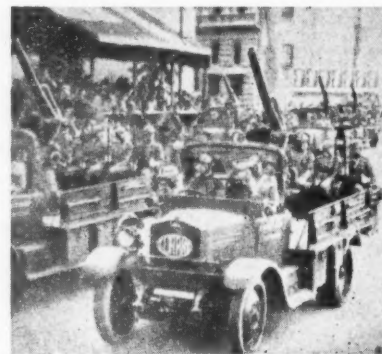


FIGURE 5.

Modern Cavalry on the Eastern Front

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Militär-Wochenblatt*.]

The first great movements carried the modern cavalry of the *Schnelle Truppen* (Fast Units) within a few days time past the river along the frontier and away into the country which was to give the modern mounted men the hardest and at the same time the most remunerative of tasks.

The thought of a campaign in Soviet Russia arouses in the minds of old World War cavalymen the memories of the broad spaces which, with their opportunities for free movement, constitute ideal terrain for their arm. How could a cavalryman help fulfilling his many-sided task in this completely open terrain of western Europe? Do these thoughts and memories still agree to-day with the facts? Our experiences furnish an answer to this question.

The first rush of the *Schnelle Truppen* carried us as part of an armored corps from the river Bug to the southern edge

of the Pripet marshes. In just a week's time, long marches had taken us a considerable ways past the infantry and far to the front in contact with the enemy. For the first time in the war we overtook motorized units which were stuck fast in the deep sand of the so-called main Russian highways.

On the forenoon of 28 June 1941, we men of the cavalry division stood ready to fulfill the first great mission assigned to modern cavalry in the eastern theater of operations. While the tank corps formations rolled farther and farther away from their rear contacts on one of the main highways toward the east, we had the difficult task of providing positive security for their right flank during the execution of the maneuver which had been decided on.

At 2:00 PM the mounted elements arrived. The motorized elements were to be left behind and had to return over

other routes. Before us lay the trackless Pripet marshes which, with their great forest and swamp areas, afforded an adversary acquainted with the country the best of opportunities to make a thrust deep into the flanks of our armored divisions. First we passed through the Jezziola sector. As in the good old days, we marched past our General, ready, silent, and unannounced, to contribute our part in the success of the operations. Our task, however, was only to be accomplished by our ability to overcome all terrain difficulties with the aid of our trusty horses, only by long and strenuous marches as well as readiness to fight at a moment's notice.

So we rode on, from the gray hours of early morning until late into the night, through sand and swamp, always in contact with the armored division. It required the utmost from horse and rider. Again our East Prussian mounts showed that a better cavalry horse was never bred. Hunger and thirst, heat and dust, flies and, not the least, the heavy burden of the guns on their backs or the wagons pulled through the sand, nothing stopped them. Our goal was always reached at the scheduled time and even though there remained but little time for necessary rests, our best war comrades, the horses, willingly performed their heavy tasks.

Without any engagements worth mentioning, our assigned task was accomplished in the space of three days' time. In spite of this, many a faithful horse succumbed to the terrible exertions and after discharging its duty to the point of exhaustion under the saddle or in the harness, could only receive a merciful bullet as thanks. While in this first case our task was movement on horseback through the trackless terrain in constant readiness for combat, the immediate future had entirely different tasks in store for us—combat on foot with all the heavy weapons of modern cavalry.

Still in contact with the armored division, we were now trotting along toward the east over more even roads and soon crossed the next great river. A

day's march ahead of the main infantry force, we now had to hold and extend a bridgehead. After spending a few days guarding the rear lines of communication of the armored division, we had a night alarm and moved away, turning toward the south. While our commander, far ahead of the formation, received the orders for our engagement, we met here for the first time during this campaign the vanguard of our infantry which had been moving forward by forced marches. We prepared for dismounted action along with the infantry and on its outer flank. Here again a beautiful cavalry picture was offered. The squadrons deployed out of the marching column made skillful use of the terrain and soon reached the line where the order was given: "Dismount for combat! Squadron commanders forward!" When we remounted again, many a good comrade was no longer with us.

Then for three days hard attacks on foot carried us ahead past positions built for permanent defense to the sector which we held for nine days under intense fire from enemy artillery and against repeated assaults by enemy infantry which at times were supported by tanks.

For two weeks we fought on foot, side by side with the infantry. We had not seen our horses for two weeks, and yet it was a task for cavalry because of the fact that cavalry was ready for engagement when needed on account of its great mobility and was quickly able to begin the fulfillment of new missions at the conclusion of the action.

Cavalry was again able to prove its value in Russia both in movements on horseback and on foot. But how different conditions are from other days! There are no more fast rides over wide plains. Only the ability to accomplish rapid movements over difficult terrain is required. There are no more mounted attacks at full gallop. It is the engagement of heavy weapons assisted by the speed of the horse which characterizes the combat of modern cavalry.

commander was given a definite mission and the initial phase of the engagement was developing in accordance with the decision of the division commander. The general direction of the attack was southwest, while the basic fire system of the enemy was directed north. This made it easier for tanks and infantry to advance into the zone of enemy firing positions and had compelled him to retreat speedily from his defensive line. This action cost the Germans heavy casualties.

Our artillery was supporting the infantry by an unceasing fire to a depth of 3 to 4 miles. Change of firing positions was being executed by the artillery battalions and in such a manner as to have the reinforcing artillery provide intensive fire support to the infantry at the moment when the division artillery had to slacken its fire. It should be noted that during the entire engagement which lasted a whole day, the division artillery changed positions twice, while the reinforcing artillery moved only once. This aided the continuous nature of artillery fire.

During the day units of the division advanced to a depth of seven and a half miles. Enemy losses were heavy. The enemy lost control of its units and it was doubtful whether he could offer strong resistance. The situation was developing in such a manner that it was possible to develop the success and continue the advance in order to capture the enemy's second defensive line.

This, however, was not done. The fundamental error was in that the division commander had no fresh forces at his disposal in order to develop the success. All his units were fatigued by the battle which lasted many hours. In addition to this he had suffered some losses which had increased the shortages he already had previously.

Sight must not be lost of the fact that an enemy strong point cannot always be captured immediately. Some times it is necessary to block it off, for which some troops must be diverted. In this instance the division was forced to take possession of three populated points which the enemy had organized for strong defense. In order to block them off, fully one-third of the division had to be diverted.

Thus elements of the division, having fought their way forward, stopped before the second enemy defensive line. The enemy made use of this. During the night he collected his scattered and defeated units and brought up reserves. He succeeded in holding his second defensive line.

What are the lessons which should be drawn from this offensive action?

Cooperation is Essential

First of all, let us discuss the questions of cooperation. Insofar as artillery was concerned everything was in order. During the battle there was constant personal liaison between the division and the artillery commanders. Their OP's were adjacent. Forward artillery observers were with the infantry units. This made possible the timely correction of fire and change of position. It must be noted, that during the development of the battle, when our units are breaking into the enemy rear, the utilization of reinforcing artillery is rendered difficult because of the inter-mixing of our and enemy units. The line of advance elements becomes extremely tortuous. In order to avoid hitting our own infantry the reinforcing artillery must fire with maximum care.

The cooperation between the infantry and tanks was less successful. It is our

Questions Affecting the Division in Offensive Actions

[An article by Major General A. Lopatin, Red Army.]

While the opening paragraphs of this article may not appear especially interesting, it is believed that reading through to the end will more than justify the reader's time when the value of the whole article is considered. Appearing first in the Russian newspaper Krasnaya Zvezda, the article was translated at the Command and General Staff School, Fort Leavenworth, Kansas.—THE EDITOR.

Field Service Regulations of the Red Army stress the fact that offense is the most complicated form of combat. This is fully confirmed by the experiences of the present war. Offensive action more than any other form of combat requires the closest cooperation of various arms, efficient and uninterrupted command, and the most thorough organization. Only under those conditions will the offense develop in accordance with the commander's plan, resulting in the solution of problems at hand.

During many months we have engaged in many offensive battles and have ac-

quired certain experience. Particularly have we obtained good experience in offensive action of a reinforced infantry division engaged in direction of the main blow. Let us take up some concrete examples.

One of our infantry divisions was ordered to attack the enemy who had sufficiently long time at his disposal to prepare a well developed system of field defenses. The division was attacking on a sector of 2 + miles, although it was somewhat under strength having been previously engaged in action. There was some numerical shortage of infantry as compared to other weapons which, as a whole, weakened the power of infantry fire. The division was reinforced by tanks and artillery. In this instance the tanks were used in mass. Artillery was distributed as usual. Battalion and regimental guns accompanied the infantry directly and fired on individual enemy firing points.

Prior to commitment, measures were developed providing for cooperation of the various arms on the battlefield. Every

opinion that it is not advisable to employ the tanks in an independent group in those instances when the division is engaged in a breakthrough of a previously prepared enemy defense, in the direction of the main blow. Detailed understanding is important between the infantry and tank commanders in order to assure precise cooperation on the battlefield. In the case under discussion, however, such an understanding could not and did not exist. The tanks moved in an independent massed group, executing the division commander's mission. Repeatedly they broke away from the infantry and because of this they did not receive sufficient support from the battalion and regimental artillery and sustained unnecessary losses. To call from within the tank during the battle for the support of division or reinforcing artillery is a very complicated and not always a feasible matter.

Hence, in our opinion, the following conclusion suggests itself. If the infantry division is engaged in the direction of the main thrust and is faced by an enemy defending a previously organized position, it is necessary to give tank reinforcements to infantry. For instance, a tank company should be assigned to an infantry regiment or battalion (depending on the number of tanks at the disposal of the division commander). Under these conditions the commanders of infantry and tank units will be able to attain full understanding.

The situation is different if the breakthrough has been already accomplished and tanks must be thrown forward for the pursuit of the retreating enemy in order to cut off his retreat or to defeat the reserves which he is bringing up. In such a situation it is fully advisable to employ the tanks in an independent group and, in addition, infantry parties should be placed atop the tanks.

Air-Infantry Cooperation

Let us now take up the next question—cooperation between infantry and aviation. During the period of preparation the division commander makes a request for aviation support while his staff estimates its action with respect to time element. During the battle, cooperation is attained through the presence of the aviation commander at the division commander's OP. It is his (aviation commander's) task to facilitate the prompt execution of the division commander's requests. The aviation commander controls the action of the air forces and makes efforts to assure the use of clear and timely recognition signals (panels, flares) by the advanced ground elements.

The desired result of air-ground cooperation is achieved, above all, by the assignment of clear, precise missions to air elements. Experience of many battles shows that the air blow against the enemy front line does not always bring the necessary effect. Enemy infantry frequently occupies well covered trenches and dugouts. Even dive bombers are not able to silence infantry fire for any appreciable length of time, for the probability of direct hits by aerial bombs on dugouts and trenches is very low. An aerial bomb, even though it hits close to a trench, does not cause material damage.

Taking this into consideration we have employed a different method of cooperation during one of the engagements. The aviation was assigned the mission of silencing enemy artillery for as long a time as possible. For this purpose small

groups of aviation (each such group may consist, for instance, of two bombers and five fighter aircraft) systematically took turns in flying during an entire day over the enemy artillery positions. As soon as the bombers unloaded their bombs the fighters attacked the enemy.

Under such activity of our aviation the personnel of enemy guns had to run for cover and cease firing. Enemy artillery suffered certain losses that day and fired very little. This permitted us to cease counter-battery fire and to concentrate a



RUSSIAN SOLDIERS RIDING TO BATTLE ON TOP OF TANKS

stronger fire against the enemy front line. This example is not intended as a pattern. It only shows how flexible and how varied can be the methods of air-ground cooperation.

Unit Commander's Initiative

To a large extent the success of every battle depends on well organized direction. Combat experience illustrates how important is the assignment of missions to unit commanders. If the unit commander knows his mission thoroughly and clearly understands the intentions of his superior, his actions in combat will be confident and he will show his initiative with greater daring in order to attain the desired result.

It is not necessary to stress the particularly important role of the commander of an infantry regiment in the direction of a battle. It is he who has the opportunity to make a quick estimate of the situation, follow it with a decision and execute the latter in the shortest possible time. But this is attainable only under the condition that the regimental commander has sufficient means at his disposal and does not have to ask for the sanction of the division commander every time. Therefore, in our opinion, tanks should be assigned to regiments. And not only tanks. As the engagement develops in depth of enemy defense it is also advisable to assign to the regiments part of division artillery. The regimental commander will then be able to execute any tactical mission which at times may be very important to the division as a whole.

Conversely, the lack of freedom in the regimental commander's decisions (at

times explained by the fear of having to bear responsibility in case of a failure) causes great loss of time and a failure where success was otherwise assured. Not so long ago the following episode took place on our section of the front. The enemy, defending a village which had been transformed into a strong point, undertook a night attack with about 300 men. Apparently this was an exploratory action. The battle lasted 45 minutes and the enemy was thrown back. The enemy attacked with the garrison of the above

strong point. Therefore, having repulsed the attack, the regimental commander had the opportunity to organize pursuit and, following the enemy closely, break into the village, or, by holding him with a frontal attack to assault the strong point from the flank. In both cases the village would have been easy to capture. But while the regimental commander was asking the division commander's consent, the favorable moment was lost and the enemy retired to the village, consolidating his position.

In order to attain better observation of the field of battle the commanders of infantry divisions and regiments strive to place their OP's as close as possible to their forces, in order to be able to see them to a distance of two or two and a half miles at least. Even if the report from the regiment or a lower unit is late in arriving, the commander himself can feel the pulse of the battle. By the tempo of fire and the changes of center of action he is able to determine how the battle is progressing and make his dispositions accordingly.

When, having broken through enemy defenses, our units are engaged in depth and their control is rendered difficult, the best method is to send well prepared staff officers to the most important spots of action.

Such are some of the questions, effecting the offensive combat of an infantry division, which arose as a result of the battle experiences on our sector of the front.

The Single Gun In Antitank Action

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article in *Krasnaya Zvezda*.]

During our artillery action against tanks a great role is played by guns operating singly. Each such gun can not only destroy up to ten enemy tanks, but it can also delay for a certain time the advance of a considerable group of tanks, or force them to change their initial plan.

Once our reconnaissance established that a group of 40 to 45 German tanks of the 11th Tank Division was trying to capture a certain populated point. Thanks to the skillful actions of a gun crew led by Corporal Kudryashov the Germans failed in this mission. Let us see how the gun crew acted.

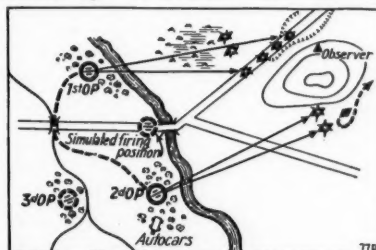
The order was to stop the enemy tanks on the river bridge in order to protect the regrouping in which our elements were engaged. After a careful reconnaissance the gun commander designated three firing positions for his gun. At the same time comrade Kudryashov tried to assure that the basic field of fire will not be changed with the change of position.

The firing positions were situated 100 to 150 meters apart. An automobile (probably a prime mover, Ed.) was placed near the gun for speedy execution of the necessary movements. At the bridge the men had created a simulated firing position using shell boxes for this purpose. Observers were sent forward to the hill, whose task it was to warn by a prearranged signal of the appearance of tanks.

In the morning the observers warned the gun commander of the movement of tanks. Altogether four tanks were moving at intervals of 40 to 60 meters. The observers hid in crevices, having bottles with incendiary fluid on the ready, while the gun was prepared for fire from the left position, which afforded flanking fire.

As soon as the leading tank passed the hollow in the road, it was stopped by the very first round. The shell shattered the base of the turret. The next two shells disabled the tank which was bringing up the rear. The remaining tanks opened lively fire on the simulated firing position. After several rounds they ceased firing: the second tank was hit by the gun and the third caught fire from the bottle thrown by the observers.

The gun fired several rounds at the disabled tanks, following which the crew quickly moved the piece into position on the right. Corporal Kudryashov calculated that movement on the road was blocked by the disabled tanks and that



the next tanks would be coming up from the right as there was a swamp on the left.

After a while another five German tanks put in their appearance. The gun commander's supposition about their actions was justified. Two tanks turned to the side and got stuck in the swamp, the other three emerged from behind the hill to the neighboring road. Of these, two tanks were destroyed by the gun firing from its second position and the third tank turned back (see sketch).

Altogether, due to the clever and well conceived actions of the gun crew, and thanks to its perseverance and combat skill, six German tanks were destroyed or disabled. The two tanks which got stuck in the swamp were burned later. Thus, eight fascist armored vehicles were put out of action. Having executed its mission the gun proceeded to a new position.

This example shows that the main thing in the action of a single antitank gun is the initiative of the commander of its crew. Corporal Kudryashov accomplished detailed reconnaissance in the field of fire and this enabled him to determine where the enemy tanks would pass, and thus to select the best firing positions and lay out a plan for the most effective fire. The supplying of observers with incendiary bottles also brought good results.

Tactics of Retreating German Units

[From an article in the Red Army newspaper *Krasnaya Zvezda*.]

The following is taken from an article written by a Soviet Army Major for the Russian newspaper Krasnaya Zvezda. The action described occurred somewhere on the Russo-German Front in the winter of 1941-1942.—THE EDITOR.

One may define the proper tactics of pursuit as deep envelopments and encirclements of the retreating enemy units. Frontal attacks, no matter how strong, will not prevent an enemy from withdrawing the mass of his troops.

The tactics of German withdrawals are to present a fairly wide front with the main roads as an axis while using every means to obstruct the advance of pursuing troops, to use mines extensively, and to defend buildings and crossroads along the main axis of movement. Side roads leading to the main highway are usually heavily mined.

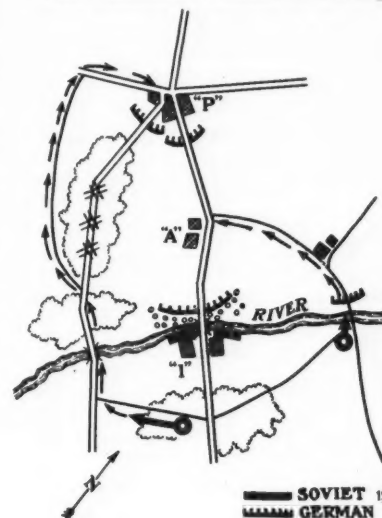
The Germans cover their withdrawals with strong rear guards and small mobile detachments. The detachments are made up of motorized infantry frequently reinforced with a small number of tanks. The advantage of such units is their great firepower and mobility. Rear guards move by bounds, utilizing buildings, crossroads, bridges, and natural obstacles as points of defense on the main route while the mobile units try to control parallel roads and those leading to the main route.

The Germans habitually stick to the roads both in the offense and defense and try to force the enemy to attack frontally. The Soviets too frequently attacked frontally rather than enveloping the enemy. The Germans usually held their positions as long as it was necessary and would then entruck and move quickly to the next position.

The main mission of pursuit is to seek out the main forces of the enemy, cut off their retreat and destroy them. The following is an example of an actual operation of this type:

"After showing stubborn resistance the Germans were driven out of 'I' and continued their withdrawal to 'P.' The rear guard took up a position on the highway on the opposite bank of the river from 'I.' The ice on the river had broken up as a result of the Germans' having blown up the dam upstream. Reinforced with tanks and artillery the German rear guard succeeded in repulsing our attempts to force the river at 'I.' The crossing was prevented by heavy machine-gun fire and mortar fire. One company managed to reach the opposite bank but sustained considerable losses from a mine bed planted along the bank.

"The fight went on here two days, and only a small reconnaissance patrol was able to get across the river. The determination of the enemy to hold here indicated that he had not managed to get all of his units from 'I' to 'P.' It also showed that he wanted to hold the crossroads at 'P' which was an important point for the withdrawal of troops. It would have been dangerous for the pursuing troops to become involved in a prolonged fight. Fortunately, the Red commander decided to envelop.



"The execution is shown on the accompanying sketch. Our mobile detachment (tanks and motorized infantry) avoided the road blocks, came out on the crossroads west of 'P' and attacked, threatening all enemy units between 'I' and 'P.' Another unit of ski troops reinforced with tanks and antitank guns moved on the right and cut the road at the village 'A,' placing the German units at 'I' in a critical position. This double envelopment decided the engagement. The Germans sustained considerable losses. A bold maneuver accomplished what a two-day frontal attack failed to do."

During the envelopment there should be no let up on direct pressure; mobile units should be used in force and not split up into small detachments. Tanks must remain as the main weapon of the mobile units which are assigned to cover parallel roads.

Functions of Camouflage

[From an article in the *Information Bulletin of the Washington Embassy, U.S.S.R.*]

The fighting on the Soviet front has proved that camouflage is one of the most important branches of military engineering.

The camouflage expert's first function is to conceal men and matériel from enemy observation and so to reduce casualties to a minimum. His second function is to conceal troop movements, thus safeguarding the surprise element so important to any military operation. He has to insure that the operations of whole army units, as well as of individual men, tanks, and batteries, retain this vital surprise element. His third function is to divert the enemy's fire. He erects dummy defenses and simulates troop concentrations, thus forcing the enemy to squander ammunition, strength, and time.

The combined use of various means of camouflage directed towards concealing troops and military objectives, and the simultaneous display of dummy military objectives as well as the simulation of troop concentrations, mislead enemy scouts.

Whatever the scope or character of operations, whether reconnaissance, offensive, or defensive action, the success of camouflage depends on its timing and completeness. Camouflage should not be restricted to mere concealment, for that is a passive method.

Since the first year of the war on the Soviet front we have not heard of a single instance in which tactically correct and timely camouflage failed to give positive results.

On one sector of the Kalinin front the command required information about the enemy's firing system. Three scouts set out one night for this purpose, taking with them two dummies of soldiers. During the night and before the moon had risen, the dummies were placed at the edge of a wood and connected by strings to the scouts' hiding place in the bushes. When the moon rose, the soldiers brought the dummies to life by manipulating the strings. Observing the "night reconnaissance," the enemy opened fire, providing the scouts with the necessary information about the gun positions.

In one sector of the southwestern front a unit proposed to break out of an encirclement by forcing a river crossing. The spot chosen for the crossing gave

good concealment for groups of men. A sham crossing was planned some distance away. When the real ponton bridge was built it was seen and bombed by the enemy. Then the construction of a dummy bridge was begun about five miles away.

Making certain that the damaged bridge was not being repaired and that a new one was being constructed some distance off, the enemy concentrated all his fire on the dummy. He then observed that the bomb damage to this "new" bridge was being repaired under fire. This convinced him that the new ponton bridge was the real one. Meanwhile, under cover of darkness, our troops crossed the river over the smashed bridge which, though not repaired, afforded means of crossing.

On the Ukrainian plains earthen and wooden pillboxes one and a half to two yards high were built in anticipation of recent campaigns. Thanks to the absence of woods, bushes or buildings, the enemy had a good view of these fortifications. Next to the pillboxes, trenches were built, which were hardly visible because of the lowness of the parapet and good camouflage. These trenches were scattered over a wide area, and their great number prevented the enemy from holding any particular one under fire.

As soon as our troops had taken up their position along this line, enemy scouts became active. The Soviet commander ordered those who were manning the pillboxes to fire on the reconnaissance patrols. But as soon as the enemy began artillery fire in preparation for an attack, our troops were ordered to abandon the pillboxes and the nearest trenches.

Before attacking, the Germans concentrated their dive-bombers and their artillery fire on the earthen pillboxes, most of which were destroyed. Our troops suffered no losses. The Germans then launched their attack, but were repelled with heavy losses by powerful fire from the trenches.

The German tanks, operating against pillboxes which turned out to be empty and finding themselves under unexpected fire from antitank rifles and guns, also suffered severe losses. This example of skilful combination of real and fake defense works illustrates the usefulness of dummy fortifications in deflecting the concentrated fire of the attackers.

In their hands the tank troops of the Red Army have a terrible weapon. Not a single German tank should escape unharmed when it meets Soviet tanks; the German tanks should be destroyed or disabled. We should merely know how to fire accurately with the tank cannon or machine gun and know the most vulnerable points in the armor of the German tanks.

II. Manner of Conducting Fire for the Destruction of Enemy Tanks.

For the successful conduct of fire against enemy tanks we should proceed as follows:

a. While conducting fire against enemy tanks and while maneuvering on the battlefield we should seek cover for the body of our tanks in the folds of the terrain.

b. In order to decrease the angle of impact of the shells fired against the body of our tanks and at the same time decrease their power of penetration we should try to place our tanks at such an angle to the enemy that the tube of the cannon is directed at an angle to their body.

c. In conducting fire against German tanks we should carefully observe the result of hits; we should continue to fire until we see definite signs of a hit (burning tank, the crew leaving the tank, shattering of the tank or the turret). Watch constantly enemy tanks which do not show these signs and which for the time being show no signs of life; while firing at the active tanks of the enemy, one should be in full readiness to renew the battle against the first tanks.

III. Basic Types of German Tanks and the Most Vulnerable Parts of Their Armor.

The most extensively used types of tanks in the German Army are the following:

1. 11-ton tanks "Praga" ("TNG-C-38T").
2. 20-ton tanks "T-3."
3. 22-ton tanks "T-3."
4. 22-ton assault tanks "Art-Sturm."
5. 24-ton tanks "T-4."

In addition to the above-mentioned types of tanks the German Army makes use of tanks of all the occupied countries. In their tactical-technical characteristics, armament, and strength of armor these tanks are inferior to the models mentioned below.

The German 11-Ton Light Tanks "Praga TNG-C-38T."

The basic dimensions of tanks: length, 4500 mm; width, 2150 mm; height, 2220 mm.

The armor of the body of the tank is riveted. The thickness of the armor is as follows: front, 50 mm (2 plates 25 mm each); side below turret gear case, 30 mm; side of the body, 15 mm; stern, 15 mm.

The thickness of the front armor of the turret is 50 mm (2 layers of 25 mm), the sides and lower parts of the turret 30 mm, top and bottom of the tank 10 mm.

Maximum speed of the tank: 35 km per hour.

Crew: 4 men.

The tank is armed with a 37-mm tank cannon and two 7.92-mm machine guns.

The tank has a gasoline engine of 140 h.p. placed in the back part of the tank; the transmission is placed in the nose of the tank. The tank has two gasoline

Soviet vs German Tanks and Armored Cars

[Digest of instructions published for the use of the Russian Army. Translated from the Russian in the War Department, Washington, D.C.]

I. Tanks of the Red Army and Their Armament.

The tanks of the Red Army, heavy, medium, light and small have a powerful artillery armament and are able to destroy or disable any German tank.

In Table I we give the distances at which the armor of German tanks may easily be penetrated by the shells of the cannon of our tanks.

As we can see from the table the armor-piercing shells of the 57-mm and 75-mm cannon penetrate the armor of German tanks at any point and at any angle of incidence, at all distances of effective direct fire (1,500 meters).

The large caliber 12.7-mm machine gun and the 20-mm cannon of small tanks can, with armor-piercing bullets and projectiles, penetrate the armor at vulnerable points at distances up to 200 meters. Tank artillery is effective against the tracks and all the running parts when we use 76-mm and 57-mm shells. In firing shells of smaller caliber the moving parts may be destroyed only with concentrated fire.

Concentrated machine-gun fire from tanks at close range (100-200 meters) conducted by means of sighting devices and through the peepholes can blind the tanks of the enemy and disable the crews.

FOREIGN MILITARY DIGESTS

TABLE I

DISTANCES IN METERS AT WHICH THE ARMOR OF BASIC TYPES OF GERMAN TANKS MAY BE PENETRATED

Type of Gun	Type of Shell	Type of Tanks														
		Praga Tank TNG-C-38T			20-ton Tank "T-3"			22-ton Tank "T-3"			22-ton Tank "Art-Sturm"			24-ton Tank "T-4"		
		Front Armor 50-mm	Side Armor 15-mm	Stern Armor 15-mm	Front Armor 30-mm	Side Armor 30-mm	Stern Armor 30-mm	Front Armor 60-mm	Side Armor 30-mm	Stern Armor 30-mm	Front Armor 50-mm	Side Armor 30-mm	Stern Armor 30-mm	Front Armor 60-mm	Side Armor 40-mm	Stern Armor 20-mm
12.7-mm Machine Gun, 20-mm Cannon	Armor Piercing	.....	300	300	200	200	200	.....	200	200	.....	200	200	.....	.....	250
45-mm Tank Gun	Armor Piercing	200	1500	1500	1000	1000	1000	.....	1000	1000	50	1000	1000	.....	400	1500
57-mm Tank Gun	Armor Piercing	At all distances of effective direct fire (1,500 m).														
76-mm Tank Gun (F-34)	Long Range Brisant Land Mine	1000	1000	1000	1000	1000	1000	.....	1000	1000	1000	1000	1000	.....	1000	1200
76-mm Tank Gun (F-34)	Armor Piercing	At all distances of effective direct fire (1,500 m).														
Remarks	Distances of armor penetration given for angles of impact amounting to 70 degrees; with an angle of impact of 90 degrees the power of penetration is increased.															

containers placed on the sides of the body in the lower part of the engine section (in the vicinity of the 3rd and 4th rollers).

A 45-mm gun can, with frontal fire, destroy the circular turret of the machine gun, the firing devices, and the observation devices and lower part of the cannon arrangement from distances up to 300 meters.

In firing against the sides and rear of the tank armor-piercing bullets from a 12.7-mm machine gun will penetrate the armor at a distance of 200 meters.

Against Tank "Praga TNG-C-38T" fire as follows:

a. From the front—against the turret, gun-shield, and below the turret gear case.

b. From the side—in the zone of the 3rd and 4th rollers, against the drive wheel, and at the gear case under the turret.

c. From behind—against the circular window, and against the exhaust (or muffler).

Remarks: 1. In frontal fire with shells of the brisant land mine type, the armor of the turret may be destroyed more quickly than the front part of the body.

2. In firing at the side and stern of tanks, the plates of the body are penetrated quicker than the plates of the turret.

German 20 and 22-Ton Tanks "T-3."

The basic dimensions of the tanks are as follows: length, 5400 mm; width, 2910 mm; height, 2490 mm.

The armor of the body of the tank is welded.

The thickness of the armor of the 20-ton tank is: front, sides, stern, and turret, 30 mm; top and bottom, 16-20 mm.

In the 22-ton tank the vertical plates of the front parts of the body, of the turret gear case below, and of the stern are reinforced by additional armor plates having a thickness of 30 mm.

The armor plates of the body and of the turret have an angle of inclination up to 25°.

The maximum speed of the tank is 60 to 70 km per hour.

It has a crew of 5 men.

The armament of the 20-ton tank: one 37-mm cannon and three machine

guns having a caliber of 7.92 mm.

Armament of the 22-ton tank: one 50-mm cannon and 2 machine guns having a caliber of 7.92 mm.

The engine has a power of 300-320 h.p. and is placed in the stern of the tank; the transmission is in the front part.

The gasoline tank has a capacity of 300 liters and is placed in the engine section to the right of the engine (in the vicinity of the right track support rollers behind).

To fire at tanks "T-3" (20 and 22-ton): a. From the front—at the armament shield, at the front opening of the driver, and at the front circular arrangement.

b. From the side—against the engine part of the side, against the turret opening.

c. From behind—under the turret, and at the exhaust.

Remarks: 1. In firing from the front against tank "T-3" 22-ton, the turret is the most vulnerable part in comparison with the front part of the body and the below-turret gear case.

2. In firing at a tank from behind, the turret is also more vulnerable than the rear of the body of the tank.

3. The front, side, and stern armor of the body and the turret of tank "T-3" 20-ton are of equal strength.

German 22-Ton Assault Tank "Art-Sturm."

The assault tank has the same chassis as tank "T-3." The basic dimensions of the tank: length, 5400 mm; width, 3000 mm; height, 2050 mm.

The armored body of the tank is welded.

Thickness of armor: front, side, and stern, from 30 to 50 mm with different angles of inclination for the plates. The thickness of the armor of the top of the engine section and the bottom is 15 mm.

Maximum speed of tank: 50 km per hour.

Crew: 4 men.

The tank has a 75-mm gun mounted in a fixed turret. There are no machine guns or openings for fire with side arms.

In the back part of the tank is a gasoline motor of 300-320 h.p. The gasoline tank has a capacity of 300 liters and it is installed in the engine section to the right of the engine (in the vicinity of

the back track support rollers on the right).

The transmission is placed in the front part of the body of the tank.

Fire against assault tank "Art-Sturm" (22-ton) as follows:

a. From the front—against the front plate of the body, the driver's opening, and under the cannon.

b. From the side—against the engine part of the side and the turret.

c. From behind—against the exhaust, under the turret.

Remarks: The best destructive effect is obtained by shell hits in the most vulnerable part of the tank: from the front—against the front plate of the armor of the body; from the side—against the right plate of the side; and from behind—against the stern.

German 24-Ton Medium Tank "T-4."

The basic dimensions of the tank: length, 5850 mm; width, 2850 mm; height, 2630 mm.

The armor of the body of the tank is welded.

The thickness of the front armor is 40 to 50 mm; the side armor, 20 to 40 mm; turret, 20 mm; top and bottom, 10 mm.

Maximum speed of the tank: 50 km per hour.

Crew: 5 men.

The tank is armed with a 75-mm tank cannon and with two machine guns having a caliber of 7.92 mm.

The tank has a gasoline engine with a power of 300 to 320 h.p. installed in the back part of the body; the transmission is arranged in the front part of the body.

The gasoline tank is placed in the middle of the body of the tank, at the bottom under the turret (the lower 2nd and 3rd track support roller of the running parts).

To fire against the medium-size tank "T-4" (24-ton):

a. From the front—against the turret, under the cannon, against the front opening for the driver, and the machine gun opening.

b. From the side—at the side armor plate in the middle of the tank and of the engine section, and against the turret opening.

c. From behind—against the turret and against the exhaust.

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Remarks: 1. In firing against the front of the tank, the armor of the turret is weaker than the front plate of the below-turret gear case and of the body.

2. In firing at the sides of the tank, the armor plate of the engine section and of the turret are more vulnerable than the armor plate of the below-turret gear case.

IV. Fighting German Armored Cars.

The German Army is equipped with armored cars of four basic types. Basic data for German armored cars are given in Table II.

TABLE II

Basic Data of the Machine	Types of Machines			
	Light 2-axle Armored Car	Medium 2-axle Armored Car	Heavy 3-axle Armored Car	Heavy 4-axle Armored Car
Weight in tons.....	3.8	4-4.5	6.5	9
Armament:				
Cannon (Number and caliber in mm).....		1-37	1-20	1-37
Machine Guns (Caliber 7.92-mm).....	1	1	1-3 (of these 1 A.A.)	1
Number of men in crew.....	2	3-4	4	4-6
Thickness of armor in mm:				
Front.....	10	10	15	20
Side.....	7-9	7-9	10	5-20 (Turret-30)
Location of motor.....	Back	Back	Front	Back

Plan of Organization for a Modern Mechanized Army

[Extracted from *Machine Warfare: An inquiry into the Influences of Mechanics on the Art of War*, by Major-General J. F. C. Fuller, British Army.]

In my *Lectures on F. S. R. III* (1932), I wrote: "In my opinion, the future will reveal to us that a mechanized army, or formation, must be organized in two wings—a tank force for offensive power, and an antitank force for protective power, the first consisting of mobile machines, and the second of transportable antitank weapons which can follow up the first and establish a modern wagon 'laager' in rear of it, or in its vicinity."

The main types of machines required for the tank wing should by name be related to the functions of finding, protecting and hitting, and not as today—to their weights. The names light, medium and heavy convey no tactical ideas, therefore these three types should be called reconnaissance tanks, artillery or antitank tanks and combat tanks.

Of each of these categories two types are required:

Reconnaissance Tanks: A light quick-moving scout machine and a long, very rapid reconnaissance tank; long, in order to enable it to cover ground at high speed and cross trenches, small streams and other obstacles.

Artillery Tanks: An out-fighting weapon and an in-fighting weapon. The first to carry a field gun or howitzer of sufficiently high caliber to enable it to fire smoke shell as well as high explosive and armor piercing. And what I have elsewhere called a scout destroyer, a machine somewhat more powerful than a scout tank carrying an antitank machine gun or semi-automatic small-cal-

iber gun. Such a machine, using volume fire, would be particularly useful in close-quarter fighting.

Combat-Tanks: A machine of about twenty tons in weight, but longer and more heavily armored than the normal medium tank, and an assault machine, not so fast but more heavily armored, sufficiently so to keep out all projectiles of lesser caliber than field-gun armor-piercing shell.

Of special machines it is difficult to see where they will end, for as armies become more and more mechanized new types will suggest themselves. The following will certainly be required: an amphibian or water-crossing tank, a supply tank, a bridge-laying tank, a mine-layer, a mine-sweeper or exploder and a gas tank. All tanks of the scout-destroyer class should be equipped with smoke generators and reconnaissance machines should be able to cross water.

As the tank wing is built around the idea of the offensive, the antitank wing should be built around that of the defensive rather than merely the protective. By which I mean that its purpose is not that of close cooperation, such as between artillery and infantry, but instead to provide (1) a base of operations from which the tank wing can freely maneuver, and (2) be so equipped that it can fortify an area in which the administrative services of both wings are halted. As I have said, in conception it is more a mobile fortress, an idea

identical to the Hussite wagon fortresses of the fifteenth century.

As no such organization exists, it is difficult to say what it should consist of. Nevertheless I consider its combatant arms should include: in- and out-fighting tanks, self-propelled artillery, motorized infantry, tractor-moved cupola artillery, motorized infantry and motorized field engineers. Further, all administrative services—supply, ammunition, etc.—should be moved on tracked and not wheeled vehicles, so that, when necessary, they can follow the two wings across country.

In brief, the idea of an armored division or formation constituted on the above lines is built around the primary functions of moving, guarding and hitting. It is a mobile fortress with its garrison and its sally party. A fortress which can maneuver like a battle formation.

Though such an offensive-defensive organization will possess velocity and striking power, a glance at it will show that it is weak in volume and holding power. To revert to Alexander the Great's army, besides its companion cavalry and phalanx it included a large number of lightly equipped units, both cavalry and infantry—archers, slingers and javelin men. In fact a swarm of irregulars, which on the line of march foraged for and protected the main body, and in battle cooperated with it.

This conception introduces motorized troops, which differ from mechanized in that though they are as mobile—even more so than the mechanized—they are unarmored, and in a present-day army they should be represented by lorry-carried infantry, motorized artillery and motorcyclist infantry, organized in divisions to work with and follow up the armored divisions. Their tactics should be irregular and guerilla—that is, fighting based on a loose order and governed by self-reliance and independence of action.

Lastly, as to conquer is to advance, and as every advance should be made from a firm base, and as it would be entirely wrong to pin down the mobile formations—mechanized and motorized—a holding or occupying force is also required, as well as troops which can operate in regions unsuited to tanks—mountainous, swampy, or thickly wooded.

Here we return to marching infantry, horse- or tractor-drawn artillery and possibly also cavalry; in fact what may be called the muscle-moved army.

In it the infantry should be of two types: light infantry and pioneer infantry. In idea, the second are the slow-moving tactical base of the mechanized and motorized troops. A base which occupies the region conquered, holds it and organizes it so that administration can function smoothly.

Finally, it must not be overlooked that the whole of the above—the entire army—is the tactical base of the force cooperating with it. In 1932 I wrote:

Without the tank the rear of the air (force) is largely uncovered, and without the airplane the front of the tank is largely blind. Therefore we can deduce this fact: That in future warfare cooperation between tank and airplane is likely to prove far more important than cooperation between tank and infantry. So important that we may see tanks and airplanes forming one force, and infantry a completely separate force.

Forest Battle at Ruda Talubska in Poland

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Militär-Wochenblatt*.]

The detail in this article is so good that it was considered well to include it even though the action to which it refers is somewhat old.—THE EDITOR.

On 17 September at about 2:00 PM the battalion reached a point on the Lublin highway, two miles southeast of Garwolin. Here the formations which had been mixed during the forest fight near Potok (south of Anin) reorganized, and just northeast of Sulbiny the noon mess was served. At this time I received the following order from the battalion:

1. At 3:00 PM the company is to start out and mop up the woods southeast of Ruda Talubska. After finishing this assignment, the company will return to Ruda Talubska and rejoin the battalion.

2. It is reported that there are smaller enemy detachments in the woods about a mile southeast of Ruda Talubska.

3. A battery has been assigned to cooperate in this operation. The battery will go into position in the Zofianow area east of the Garwolin-Lublin highway. The battery commander is now on the way to Dolne, where you will meet him. In addition there are being placed under your command one light infantry gun platoon, one group of heavy trench mortars, and one platoon of heavy machine guns. The commanders of these subordinated units will shortly report to you.

4. The reconnaissance detachment which is stationed at D. Rowy with front toward the northwest will prevent enemy escape toward the south and southeast. North of this detachment, the regiment is marching toward Ruda Talubska.

5. The combat train will remain with the battalion.

Decision: After making preparations in the vicinity of Dolne, the company will attack the enemy which has been reported, and after mopping up the woods will head for the Ruda Talubska-D. Rowy highway.

Orders to the platoon commanders and commanders of the subordinated units:

1. Repetition of the situation and mission.

2. The company will march with march security one group strong to Dolne, leaving via the road leading into Sulbiny from the south. I will proceed ahead to Dolne and examine the terrain with reference to placing the heavy weapons and will make contact with the battery. I will wait for the company on the north edge of Dolne on the Sulbiny-Dolne road. Prepare equipment for marching. Get under way.

The cooperation with the battery resulted in the following decision for the contemplated course of action: After getting ready on the southeast edge of Dolne, the company will reach the course of the stream under the fire protection of the battery, then the edge of the woods. As soon as the company has penetrated into the woods, artillery fire is to be supplied

only on the appearance of red light signals.

ORDERS.

1. The infantry cannon platoon is to go into position in the area north of Dolne in such a manner that it will be able to lay its fire on recognized targets and the village of Feliksien. It establishes contact with the artillery with regard to sweeping the woods with fire.

2. The heavy machine-gun platoon will keep a watch over the right and left edges of the zone of combat with a half platoon assigned to each edge in order to prevent a lateral escape of enemy forces from the woods.

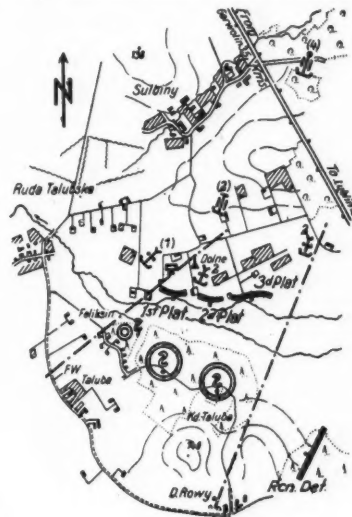
3. The heavy trench-mortar group is to go into position in such a manner that it will be able to concentrate its fire on the group of houses in Feliksien. Signal for fire will be one red and one green rocket.

4. The heavy machine-gun group belonging to the company will sweep the edge of the woods as a measure against snipers in trees while the company is crossing the stream. The group will then follow behind the company.

5. The company will be arranged with 1st platoon on the right, 2nd platoon in the center, 3rd platoon on the left. Boundary on the right, line connecting the north edge of Dolne and the northwest edge of the woods. Boundary on the left, line connecting south edge of Dolne and southeast edge of woods (shown in the sketch). The rifle troops will go through the woods in skirmish line formation with five paces interval between the men. Contact on right. Light machine-

gun troops follow in single file twenty paces behind their rifle troops.

After this preparation, the battery opened fire and the company pushed forward toward the water course. After the first few rounds, however, the enemy, whose morale was shattered, came forward in small groups and surrendered. I



COURSE OF ACTION.

picked out a place for the prisoners and appointed men to guard them. Altogether about 70 men surrendered in my sector. An additional 70 Poles on the left ran into the arms of the reconnaissance detachment.

The mopping up of the woods then continued according to plans and without resistance. I was able to report the execution of the assignment without casualties to the battalion.

Tanks In Night Combat

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article in *Krasnaya Zvezda* 16 October 1942.]

Until very recently the radius of night action for our tanks was very limited. At night marches were made, water obstacles were crossed, and tanks advanced to positions of departure for the attack. This was the extent of night activity of tanks. On the battlefield they were in action only between dawn and sundown. After this their activity was suspended until the following dawn. Opinion had prevailed that tanks at night are blind, that they lose direction, become entangled in natural and artificial obstacles, and are unable to carry on accurate fire. These arguments were recognized to be weighty and it was seldom that any one attempted to contradict them.

However, recent engagements in our sector of the front have shown that it was possible to overcome the difficulties attached to the organization of night action of tanks. True, these difficulties were great; but the effect of employing tanks at night was so great that all the efforts expended in preparing for battle were fully compensated.

For a long time the enemy was defending two tactically important hills. From these hills the enemy had good observation of the narrow strip occupied by us on the right bank of the river, as

well as of the opposite bank. All this terrain was covered by carefully registered enemy fire. The efforts of our infantry to capture these hills were without result. The enemy's massed artillery, mortar, and infantry fire denied our infantry the opportunity to advance.

Our command decided to capture the hills at night, using tanks. Under the cover of darkness a tank unit crossed the river on ferry boats and hid in the woods. The entire following day was used for the coordination of cooperation for the study of the terrain and the route to be followed, and for the organization of sure communication. In selecting the route to be followed, the morale factor, of first importance at night, was taken into account. Decision was made to drive tanks not directly on the hills, but to by-pass the latter on the south and southwest, thus creating in the defenders the impression that they were outflanked by strong forces.

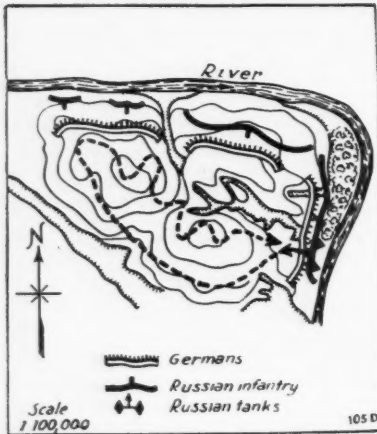
Tanks were echeloned in depth. Heavy tanks proceeded in the first echelon. The second echelon consisted of light tanks carrying atop them infantry parties (4 to 5 men with automatic arms atop each tank.) The third echelon was formed by tanks acting as prime movers for ac-

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companying (infantry) guns. The ammunition and gun crews of the latter were carried atop these tanks.

Three minutes before the start of the attack the artillery concentrated intensive fire against the outer edge of the enemy defensive position, following which the fire was transferred into the enemy rear. The artillery fire covered all possible routes of the enemy's retreat. The signal was given 30 seconds before the advent of darkness. During this interval the tanks started off from their points of departure, reached their infantry and proceeded ahead of the latter.

The moon was up and this aided the tanks. Having passed the line of our own infantry positions the tanks opened fire with every weapon. There was fire



against flashes of enemy fire and in the direction of flares by means of which our infantry was indicating targets.

Pressed from the front and flanks, the enemy began disorderly retreat. Our infantry, which was advancing behind the tanks, was destroying the retreating enemy and silencing his fire.

Enemy artillery was firing wildly, without aim, sometimes hitting its own infantry. During this night not one of our tanks was disabled. After a four-hour battle our tanks and infantry had fully

captured this center of enemy resistance. Following this our tanks maneuvered along the south and southwestern slopes of the hills, affording our infantry the opportunity to consolidate itself on the captured hills. When it became clear that both hills were under the full control of the infantry, the tanks returned to the woods for refueling, ammunition, and mechanical attention. By the time the tanks returned to the woods, they found there trucks with ammunition, fuel, and a repair crew which during the night, were brought up from across the river.

The enemy left on the battlefield several hundred dead and much matériel. The prisoners who were captured during this night stated that the night attack was a stunning surprise to the Germans. It produced the impression of complete encirclement and soldiers and officers scattered in confusion in all directions. The enemy counterattacked many times with strength up to regiment. However, all counterattacks were repelled with heavy enemy losses.

During the following days several identical night attacks were undertaken on this and other sectors of the front. All were very successful, costing but small losses in tanks. From the experience of these engagements certain conclusions may be drawn. Night attacks should be undertaken during moonlit nights when infantry can easily orient itself, indicate targets to the tanks, and aid the latter in keeping closely to the route to be followed by them during the engagement. The tanks should be employed in echelon formation. This assures movement along a comparatively narrow front and creates with the enemy an exaggerated impression of the number of tanks engaged. After having reached a certain definite line the tanks should continue their maneuvering in order to permit the infantry to consolidate itself on this line. During the attack the tanks must not under any consideration become separated from the infantry. At night tanks need the help of infantry even more than in daytime.

Night actions of tanks must, of course, be studied further. But it is undoubtedly true that this method of tank employment produces good effect and should be widely practiced.

News Concerning Italian Tanks

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Wehrtechnische Monatshefte* September 1942.]

The majority of the Italian tanks, not only in the two armored divisions, the "Ariete" and "Centauro," but also those in the tank detachments assigned for duty with rapid divisions and in the units which were in northern and eastern Africa at the beginning of the war, were the small Fiat-Ansaldo M 33's which were also used in large numbers in Spain yet which had already proven the fact that the tank arm could by no means succeed with mass and speed alone but needed more powerful armament. The M 33 was equipped with a 43 HP motor, had a speed of some 50 km (about 31 miles) per hour, was manned by a two-man crew, and was armed with a Zwillings machine gun which was able to fire forward only (Photo. No. 1). In comparison with the development and construction of these light tanks, Italy had given less attention to the manufacture of heavy tanks. Developments along

these lines began as a result of lessons from the Spanish Civil War, and the first of these modern products turned out



FIGURE 1
Light Fiat "Ansaldo" 2-Man Tanks

by mass production methods at the beginning of the present war was the Ansaldo M 11 tank.

This tank, whose chassis has been essentially retained in the new Italian Ansaldo tanks which are to be discussed, had a speed of 40 km (25 miles) per hour, a cruising range of 200 km (125 miles), and a three-man crew. Its armor possessed a thickness of 15 mm (.59 inches) in front and 28 mm (1.10 inches)

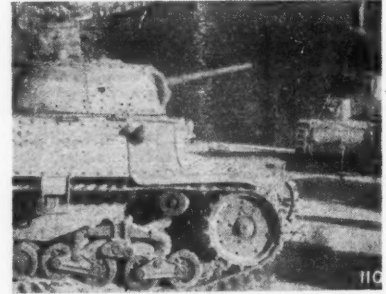


FIGURE 2
Medium Ansaldo Tank

on the sides, and its armament consisted of 28-mm Breda machine guns as well as a 37-mm or 40-mm cannon. An interesting feature of this tank was that again the cannon was able to fire only forward while the machine guns for the first time were mounted in a revolving turret. This pointed to the fact that difficulties had stood in the way of working out a method of mounting a cannon in a revolving turret and the mounting in fixed form had to be accepted. The M 11 tank was employed not only in Italy itself but also in northern and eastern Africa where, among other places, it was used in the offensive in British Somaliland.

It was clear, however, that it could serve only as a transitory type and its further development was delayed. This further development later produced the

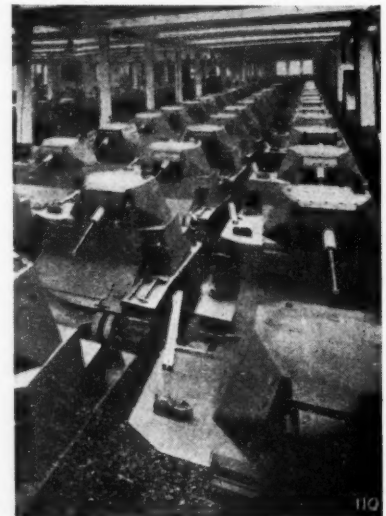


FIGURE 3
Fiat Tank L 6

M 13, an outstanding model at present. However, it was being employed but little when the first British offensive against Libya began, an offensive which, in the words of the Duce, succeeded "as a result, mainly, of the inferiority of the Italian armored forces at that time" and the lack of heavy tanks.

Let us turn our attention, therefore, to those new creations and products of mass

production which either developed since these reversals, or, constructed in great quantities at an increased tempo, determine the aspect of the present Italian armored forces. We refer, especially to



FIGURE 4a
Heavy Ansaldo Tank

three particular tanks and one scout car. Their creators are the firms of Ansaldo and Fiat to which the Italians are essentially indebted for their entire technical development. The majority of the tanks in the armored divisions engaged at the present time are the medium-heavy Ansaldo M 13's (Photo. No. 2) to which we have already referred briefly, and which was first employed in small numbers in the winter of 1940-1941. It is one of the best tanks in existence and both in battle and desert service has given outstanding proof of its value. This tank, which even in its outward appearance is very impressive, is 4.88 m (16.00 ft.) in length and 2.28 m (7.48 ft.) in breadth, and is equipped with an eight cylinder Diesel motor which gives the tank of the first constructional series a speed of 33 km (about 21 miles) per hour, and the tank of the present series a speed of 40 km (25 miles) per hour (off the highway, 15 km or about 9 miles per hour). The maximum slope which can be climbed is about 40 degrees. The crew consists of four men. The main armament—a 37-mm to 40-mm cannon—is mounted in a revolving turret which is also provided with a machine gun for defense against aircraft. There are two additional machine guns, operated by the radio operator, set in the front wall of the tank.

The Fiat L 6 model (Photo. No. 3) is the second, somewhat lighter tank that is used. This tank, which is built shorter and higher than the M 13, measures 3.80 m (12.46 ft.) in length by 1.96 m (6.43 ft.) in breadth. A four-cylinder



FIGURE 4b
Rear View of Heavy Ansaldo Tank

Fiat motor is used, giving the tank the same maximum speed as the Ansaldo tank. Its speed in traveling across country is 15 km (about 9 miles) per hour, and its ability to climb slopes is also

the same as that of the Ansaldo tank. Its crew, however, consists of two men. For armament, it has a 20-mm, rapid-fire cannon in the revolving turret and in addition a machine gun which may be used for protection against aircraft. This somewhat lighter tank which mounts a cannon has given good account of itself in action and has been appearing in increasing numbers at the front.

In addition to these two medium heavy tanks, the heavy Ansaldo M 14 tank (Photos. 4a and 4b) has been engaged with fighting armored divisions under General Zingales since the end of last year on North African soil. This tank has the same chassis as the M 13 and also the same motor, and it possesses the same speed and ability to climb slopes. The superstructure is of a new design and now carries a 75-mm cannon as its principal armament. Even in this case, for the time being, however, the cannon is not placed in a revolving turret, apparently in order to avoid a tedious constructional process as in the case of the first heavy M 11 tank in its day. We virtually have, therefore, a tank corresponding to the German assault cannon but a tank which has stood the test in an excellent manner against heavy British-American types in Cyrenaica. In addition to the 75-mm cannon, the tank carries a machine gun which may be used against aircraft. Like all Italian tanks in use in Africa, it is painted an ochre yellow, and some time ago, on the occasion of a visit to the works by German press representatives, it was shown to them.

Now that we have had a look at these three tanks, in conclusion we may con-

sider for a moment the new Italian armored scout car from the Fiat firm which is most in use today, the Fiat L (Photo. No. 5). This is a very sturdy four-wheeled car which has a reserve wheel in the center on either side. The motor is a four-cylinder Fiat. The speed is as yet unknown. The crew consists of two or three men. The car has the same turret, armed with a 20-mm cannon, as the Fiat L 6 tank. There is also a machine gun which may be used against aircraft. This car, which is manufactur-



FIGURE 5
Fiat Armored Scout Car

ed by mass production methods and employed in large numbers with Italian armored and motorized divisions in Africa, has gone through its tests everywhere with colors flying.

Thoughts On Discipline

[By "Onlooker" in *The Journal of the Royal Artillery* (Great Britain) January 1943.]

If you have ever seen a mob or riot, you will know that there is such a thing as "mob hysteria," and that an undisciplined mob will do outrageous things that that none of the individuals composing it would do by themselves. As you have mob hysteria, so also you have "mass discipline," and a disciplined body will achieve feats of endurance and bravery that the individuals composing it could not do by themselves. That is to say each member of the disciplined body gains some extra courage and stamina from his association with, and being a member of, a disciplined unit. Encouragement and confidence are derived from contact with others who put aside their fears for themselves in doing what is best for the common good. The knowledge that the other fellows with you are disciplined like you and won't let you down, heartens you to do your job and to give all your strength to hitting the enemy. The question is how to transform a rabble or mob into a flexible unit all working for a single purpose under one authority, and where the individual is prepared to sacrifice himself for the sake of the unit as a whole. Such a standard is necessary in war. It will not be achieved without training for it.

Whether a country has got it, or a military unit has got it, is discovered by the test of adversity, and you get plenty such tests in war. When things go wrong, when conditions get chaotic, when you are browned off, tired, wet, and without food, it is then seen whether you have got what it takes. It is all very well saying you have got it. No man, however brave, can

stand up to that sort of thing without training. Unless troops are trained before hand to automatic, instinctive, and sub-conscious obedience, their human instincts of fear and self-preservation will prove too much for them, and they will break. After that, the enemy with a grin on his face will just wipe them up one after the other, because their morale and cohesion are broken. In danger, raw recruits or civilians tend to seek safety in dispersion and escape; they break ranks. The trained soldier instinctively seeks safety in the ranks beside his comrades, under the principle "Union is strength." Death may not always be the worst fear. Death would sometimes be a relief from pain and exhaustion. When you have aches in your body, blisters on your feet, dry thirst in your mouth, and an empty void in your stomach, with the world crashing around you, you don't feel so good, and you have got to rely on the force of discipline to enable you to stick it out, and there is no limit to the sticking point. There comes a time in battles when through lack of numbers or lack of equipment you are overwhelmed as we have been many times in this war—Dunkirk, Greece, Crete, Singapore, Burma—with nothing but a sense of discipline holding you together. To keep going and obey orders (orders against which your tired body and mind rebel) is the only chance of ultimate safety. Had there been a panic at Dunkirk and had our men started rushing the boats at any time, the result would have been chaos. As it was, all the tired men were formed into groups

of 50, the groups got serial numbers, and lots were drawn for the order of embarkation. It was not quite as easy as it sounds. There was confusion with similar group numbers issued by different commanders and on different days, but there was never any panicking. In fact, one unit when ordered back from the place they had gained near the Mole after three days' patient waiting in queues without food or water, about-turned without complaint, and the men whistled a tune as they marched back in step together. When fate hands you what looks like a pretty good chance of being taken prisoner or any other disappointment, it is a quite good test of your discipline if you can whistle.

Not only does discipline bring *others* under control, but it shows us how to bring *oneself* under control. To be complete, man must be able to control his body. Not to be able to do so means that he is at the mercy of his passions, his fatigue, despair, and all the other emotions by which he may be swayed from time to time. To be able to control oneself and be the master over one's body is the greatest asset a man can possess. If army discipline or any other thing can give you this mastery it is worth while going out for it. The process may be trying, but the results are worth while, and valuable not only for the duration of war but during your whole life. Nothing worth having is gained without effort, and the advantages of self-discipline and self-control are worth the effort and struggle for them.

How is this thing called discipline acquired? It is difficult to put down in words. The Germans depend on coercion and fear with a blind fanaticism for an infallible Führer. The Russians are bound by love for their country and in a grim struggle against a savage invader. Some other countries do not bother much about discipline until it is too late. In this country, we have probably more individual self-discipline than in any other country, but otherwise we dislike being troubled with forms of control or regimentation. The jackboot discipline can and does produce a smoothly functioning machine, which can be very efficient indeed. But it is a machine without flexibility. Continual strain and bombardment will tend to crack it. To stand the ultimate strain, discipline requires to have something in it of the voluntary spirit. The dictators have seen this, and the Germans have inspired their people with fanaticism for Hitler. Mussolini tried the same thing, but the fable of his invincibility has worn thin, and his discipline needs external support. If, however, discipline can be self-imposed and accepted voluntarily there is all the less need for harsh compulsion, and the result is more flexible and enduring. We depend for our type of discipline largely on the voluntary team spirit, leadership, and sense of duty. Once its necessity is realized, the stubborn doggedness and unselfish team spirit that is strong in our race makes the Britisher a formidable opponent for he can "never say die."

Assuming that discipline is necessary how much is required? Is it necessary to give up all individual judgment and become a mere automaton obeying orders like a robot? Is it reasonable to assume that we should obey all necessary orders but within a latitude of judgment possessed by us as intelligent human beings? This is the crux of the matter, for the main element of discipline is obedience, and discipline is acquired mainly by learning obedience.

The whole history of all wars is full of examples of the power and effectiveness of highly disciplined over less disciplined troops and of how no army however high the standard of education, has become really efficient until obedience has become an instinct. No man but the commander can judge what is important and what is not. No commander can get the best from his unit, if he has continually to be turning round to see whether his men are following him. There can be no doubt that indifferent tactics carried out by disciplined troops are more successful than more skilful tactics carried out by undisciplined troops. Soldiers must therefore obey in all things. They may, and do, laugh at foolish orders but they nevertheless obey, because they know that to disobey is to break the backbone of their profession. It may be said that such a powerful instinct of obedience dwarfs the intellect and turns the man into a machine which is "not paid to think." This may be partly true, but only partly. The same obedience is demanded from N.C.O.'s, and officers as well, and their power of initiative, developed by responsibility, is seldom impaired. After a soldier has once become imbued with the habit of obedience, the more *intelligent* he is the more *useful* he will be, but by itself intelligence will not stand the stress of battle. Training to use his intelligence should go hand in hand with training in the habit of obedience. Bright intelligence and blind obedience: the two are not incompatible provided the soldier is trained to know instinctively when to use the one and give the other, but if once he begins to think about the justice of an order, if once he contemplates the possibility of disobedience, it is unlikely that he will rise superior to the promptings of his weaker nature and obey an order that apparently sends him to certain death. The great lack in an unseasoned soldier is that obedience is rendered on *intelligence* rather than *habit*. He does not resist authority when he considers its demands are reasonable but when he thinks these demands vexatious or unnecessary he remembers his birthright as a citizen of a free state and refuses compliance. Similarly he is willing to obey and follow a superior who is trusted or popular but has not reached the stage of recognizing the duty of obedience to *any* officer or N.C.O. just because of the fact that they are his superior officers. Personal courage is by no means equally distributed among us, and it needs only that one man should hesitate, or be permitted to hesitate with impunity, for the hesitation to become contagious. The slightest interference with the habit of obedience is fraught with the very gravest danger to the efficiency of the army. It follows therefore, that a soldier must obey orders like a robot, without question, but unlike a robot, with intelligence.

The following factors assist in the training in discipline, and the greatest of these is obedience.

1. Obedience in the field of battle will not come automatically. The habit of prompt and willing obedience requires to be developed in training before the soldier reaches the battlefield. It is not always pleasant to have to obey orders given peremptorily, or by someone you dislike, or when you think the order is unfair, or when it upsets your arrangements. Obeying pleasant orders is easy, but it is the obeying of unpleasant orders that is training in and a test of discipline. It all begins with obeying the orders of

the junior N.C.O.—someone probably younger than yourself. All that is why we must learn to "Jump to it" and learn the habit of unquestioning obedience, and why obedience is so strictly regarded. The whole framework of the army depends on it.

2. Closely allied to obedience is drill. Drill movements and ceremonial inculcate the habit of automatic and quick response to the word of command. Discipline is readily noticeable by its presence, or by its absence, in the movement of troops either on foot or by transport, and drill forms the basis of the training of movement. In addition it engenders a sense of corporate pride, and a feeling of comradeship and unity. It teaches us how to remain steady and how to hold ourselves erect and march with a minimum of effort and fatigue, all under the control of a commander. An army requires to be able to march and move long distances as quickly as possible. To bring large bodies of troops to the scene of battle intact and without undue fatigue is no small effort, and demands a high state of discipline and training.

3. By meticulous attention to details of cleanliness and smartness not only of the person, but of accoutrements and weapons, one inculcates a habit, which is essential to a soldier, for it teaches him to look instinctively to the good fighting order of his weapons and equipment. Pride in his personal appearance and smartness, if it is developed into a habit, gives self-respect and helps him to overcome conditions that might otherwise get him down. A habit of orderliness and tidiness is fostered in barracks, mainly to train the soldier always to arrange his equipment and belongings where they can readily be found in the event of an alarm and even in the dark. Such habits have saved many lives in action when it has been necessary to scramble to arms unexpectedly at a moment's notice.

4. A salute properly given and returned is a mark of mutual respect between juniors and seniors. Saluting is a help in acquiring discipline. It does not mean that your military superiors are better men than you, mentally or in any other way, but it does mean that you acknowledge obedience to their orders and through them to the King as head of the country you serve. In war, your individuality counts for nothing, but your unit counts for a great deal. You are not the only one who salutes; your military superiors have to make exactly the same acknowledgment to their superiors and obey their orders, and so on all the way through.

5. By not allowing one's physical exhaustion to interfere with military precautions or requirements one disciplines oneself and develops the habit of placing military necessities always before one's comfort. For example, after tiring maneuvers it is necessary to fill up the vehicles with petrol and oil and give them a clean down, to arrange guards or pickets and other precautions before thinking of rest. If these precautions are not taken on training, they will be apt not to be taken when required.

6. By doing that little extra, when you are tired and when the extra seems unfair, you not only help someone else who would have to do the job, but you develop a sense of achievement and satisfaction. The little bit extra of physical work cheerfully given makes all the difference between ultimate pride in oneself and one's unit, and mere existence. This pride will have a definite value to you later on.

There is no use denying the fact that most of us feel inclined to perform the minimum amount of work, but that is not best either for ourselves or our unit. When you think you are dead beat to the world and cannot go another step, it is still possible to make yourself go much further. It is possible to force your body to perform feats which would otherwise have seemed quite incredible. If you do this, you acquire a sense of elation at the victory which your mind has won over matter, that you are carried on to far greater effort and without apparent ill-effect.

7. *Esprit de Corps*, morale, and pride in one's regiment and one's comrades strengthen discipline. They are the result of unselfish cooperation and team work. They are not found in a unit lacking discipline. They express discipline at its best and provide that fine comradeship and friendship that you get in war, as a result of dangers bravely faced together, mutual dependence and the knowledge of each other's pluck and spirit in adversity.

During the last war, the writer served in the ranks in units where the discipline was strict and in others where it was slack. There can be no doubt that the private soldier has a better time of it in a unit where the discipline is strict, for there the wheels run smoothly, all ranks are kept up to scratch and the private soldier knows where he stands. In a unit where the discipline is slack, things go wrong and the person who feels the brunt

most always is the poor private soldier. The British race is well known for its bull-dog qualities and sticking power and, given training, makes the finest soldiers in the world. War is however so ruthless and makes such demands, not only physically but mentally, that it is essential to go into training like a boxer, and make preparation physically, by hard and weary exercise, and mentally by disciplining oneself to obey instantly, all and every order, good, bad or repugnant. It means living and working with or under the orders of people we dislike, so that the machine goes on smoothly. It means subordination of all personal considerations to the interests of the whole. Man is at his best when he does not think about himself. There is something rather fine and unselfish about it. There is something very fine about the trained British soldier.

One of the finest qualities in man is described by the simple word "guts"—the ability to take it. If you have the discipline to keep going when your body calls for rest, if you have the discipline to stand when your body wants to run away, if you can keep control of your temper and remain cheerful in face of monotony or disappointment, you have got "guts" and can take it. The point to remember is that your ability to take it needs to be trained, and the training is hard, not pleasant, and is mental as well as physical. But once you have got it, it has been well worth while, for not only will it have made a trained soldier of you, it will have made a man of you, as well.

Five Men And A Tank

[Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a German article in *Die Panzertruppe* July 1942.]

Vividly and concisely the following article shows the inside operations of a tank and the actions of its personnel during an action on the Eastern Front.—THE EDITOR.

"Why, sure, there's room, if you want to go along!" replied Lieutenant J. in answer to my request that I be permitted to go along in his tank in the attack on the village of W.

I sit in the center back of the driver and radio operator while above and back of me on the left the gunner, on the right, the ammunition man and in the turret in the center, the commandant take their places. The platoon, consisting of four tanks has, on one of those last winter days on the eastern front, the mission of reinforcing the infantry in retaking a village which has temporarily been abandoned. Lieutenant J., the commandant of our tank, is at the same time commander of the platoon.

When all is ready away we go. Commander, radio operator, driver and gunner are all connected by radio with one another; for it is only possible to communicate on the inside of the tank by this method, with the noise which now commences. In single file the four tanks follow the infantry, which had already gone on ahead of us. We are still a long distance from the enemy. I am able to get a good view through the commander's observation slit and observe the skill with which this noncommissioned officer guides the steel colossus around the snow drifts. In a matter of course manner, he manipulates the numerous controls before him. The machine follows the sharp curves necessitated by the rough terrain,

in negotiating which, the inside track stands still while the machine swings around on it.

Suddenly, we hear the voice of the commander: "Troops on the edge of the woods ahead of us!" In spite of the many things which take his attention, the commander is the first to catch sight of them. It proves to be our own infantry and we are soon up with them.

In the valley ahead of us lies the village against which the infantry is to move in a frontal attack, while we are to pass around the village to the left and attack the enemy in the rear. The four tanks change from single file to a deployed formation. The driver diminishes the aperture of the observation slit and we roll forward to the attack. The crew begins working with a precision almost resembling that of clock-work. Lieutenant J. recognizes enemy snow bunkers. There ensues a short halt.

The radio operator now operates both his instruments, which he has to keep changing from sending to receiving and vice versa, and his machine gun at the same time. The driver seizes the field glasses, follows the trail of the tracer bullets and corrects the fire by means of target designation. Gunner and ammunition man have the cannon ready. The command to fire is given and the first shell has hardly gone roaring from the barrel before the gunner has introduced a second. Now the machine gun above our heads is also clattering. In addition, the gunner operates the movements of the turret. One wonders how just four men with their two hands are able to manage all the multiplicity of controls, nearly

every one of which has to be operated faultlessly.

The soul of the attack is the commander, who, through the observation slit of the turret, directs the movements of our own tank and follows the movements of the other three tanks. His eyes are everywhere, in the combat sector assigned to his own tank as well as in the sectors belonging to the other three. He is busily occupied in speaking first with his own radio operator, then the driver, the commandants of the other tanks; then he reports the combat situation and location to the rear. He observes the impacts of his own artillery and corrects the fire, he sees the snow drifts which we are obliged to pass around, and he directs the whole platoon in such a way that it will not be seen too soon from the village on the right.

Now we have passed around the village, the platoon bends its course inward to the right, we turn almost in our tracks, the three other tanks on the right of us, in a broad curve, still guided by the orders of the platoon commander. Ahead of us, deep in the valley, lies the village occupied by about a battalion of Russians. The tank crew now outdoes itself. The driver operates his steering lever, announces the targets he spots to the radio operator. The gunner operates the movements of the turret, aims his cannon, fires, operates the machine gun. The ammunition man is scarcely able to keep up with him. Shell after shell goes roaring from the barrel. A fog of powder smoke fills the interior of the tank. Through the driver's observation slit I am able to follow the correct aim of our fire as it finds the targets. Explosive shells land in the straw-thatched roofs which in a few seconds' time burst into flame. With absolute accuracy the sheaves of machine-gun bullets fly into the ranks of the terrified Russians scarcely a hundred yards ahead of us. They abandon everything and seek safety in flight but are mowed down by our machine-gun bullets.

Not a target escapes the eye of our commander; and without cessation he announces them, transmits firing orders and reports; continually, the radio operator's instruments are switched from "send" to "receive"; there is an almost unbelievable display of human concentration given by these five men, geared together even in the accomplishment of the finest details of their tasks.

When Lieutenant J. transmits to the rear the report of the capture of the village, his four tanks in two attacks have either captured or destroyed 2 Russian automatic AA cannon, 5 AT cannon, and 6 field guns. The platoon commander then notes these figures down on his pocket calendar on which, since the month of January, similar notations have been made as, for example, on 19 January: "Nine enemy tanks in 2 hours." As I hurriedly look over these notes, I am forced to think of the five men in the tank. Not only of these five with whom I have been today but of all tank crews. It is they who, with their presence of mind and cool-headedness, their great technical skill, their knowledge of terrain, their skill in orientation and fire but, more than all else, their lightning-fast, mutual understanding and support, clinch victory in the difficult moments of the battle.

"Thirteen men and a cannon," are the words of an old military saying which characterizes the relationship between cannoners and their gun, and which still has its application. But modern war-

fare, to the extent that it is a war of motors, has also brought into being new concepts. "Five men and a tank," scarcely more need be said if we wish to characterize motorized warfare. Where tanks gain the victory and send home their destructive blows, it is, in hundreds and

thousands of individual cases, "five men and a tank" who win the victory. As soon as an attack is under way, the five men are on their own, trusting implicitly in their weapons and their machine—a united group, fighting through to victory, or to the death.

Trench Warfare Without Visibility

Fighting and Living Amid Grim Conditions in New Guinea.

[From *The Times* (London) 2 January 1943.]

The area in which fighting took place in Papua, New Guinea, has often been loosely described as the Buna area or the Buna-Gona area. But it must be emphasized that there were really three distinct operations taking place in three distinct sectors—Gona, Sanananda, and Buna. Gona, being the weakest held, was the first enemy stronghold to be liquidated.

At Buna considerable progress was made after light tanks of the Australian armored forces, followed by seasoned Australian infantrymen, first went into action on December 18. A wedge of allied troops was then driven between the Japanese in the Buna Mission area and those farther east in the Giropa Point area. At these two points the enemy was confined in smaller and smaller space until the operation was completed.

But this did not mean the end of the Papuan campaign. There was still a large body of Japanese on the Sanananda track. For a considerable time, advances in this third sector remained local only. Here the enemy enjoined a defense in depth for a distance of over two miles from the coast. His left flank was protected by the Giriti river and its delta, his right flank by foul and extensive swamp. Even when this sector had been cleared up, there were still Japanese pockets at the mouths of the Amboga, Kumusi, and Mambare rivers, which stand between Buna and the Japanese bases at Lae and those more northerly bases at Finchhaven and Madang into which the enemy have recently been pouring supplies.

Prepared Lanes of Fire

The Japanese fortifications at Buna and Sanananda were simple but effective. They consisted largely of systems of mutually supporting bunkers of pillboxes constructed of whatever materials were available. In building these bunkers the Japanese dug a hole as deep as the nature of the terrain permits, usually a foot or 18 in., around which they erected low walls of logs, often trunks of coconut palms. Across these they placed similar logs to form a roof. Weak points were buttressed with sandbags, empty ammunition boxes, or petrol drums filled with earth. Earth was piled all over these structures, which were then camouflaged with palm fronds or living shrubs. From slits in the walls rifles and machine guns were trained down prepared lanes of fire. Sheets of corrugated iron were used where available, but no pillboxes constructed of concrete were seen.

Communication trenches were dug and roofed in the same way. Rifle pits for single snipers were dug at strategic points, and caches prepared in trees whence snipers could pick off any Australian or American who succeeded in reaching a bunker and climbing on top of it and attempting to throw hand grenades inside.

These bunkers were virtually proof against small arms and mortar fire and offered a large measure of protection against aerial and artillery bombardment.

Since all guns and ammunition had to be brought in by air it was not possible to assemble a sufficiently powerful concentration of artillery to destroy the bunkers by bombardment. Moreover, both our bombers and field pieces had been greatly handicapped by the fact that those bunkers which we most urgently desired to destroy were close to our own lines. Some of the bunkers were taken by direct infantry assault. The price was always high, for our men had to advance up prepared lanes of fire. Others were taken by guile. Men sneaked up at night and threw hand grenades inside them.

Many devices were employed to destroy these bunkers, including Bren gun carriers, flame-throwers, antitank guns, and 25-pounders firing through open sights. The most effective means of dealing with them so far has been the tank.

Desperate Tenacity

American-made Australian-manned tanks first went into action south of Cape Endaiadere. They enabled us to occupy a large and important area which otherwise might have cost hundreds of lives. But the terrain on the North Papuan coast is not everywhere suitable for tank warfare. It is as different from the desert, for which the tanks were designed and their crews were trained, as any terrain could be. In straight lanes and on the firm ground of a coconut plantation, such as that south of Cape Endaiadere, tanks did excellent work and could blast Japanese bunkers at short range with their 37-mm cannons. But in jungle and scrub there is no visibility whatsoever; and in the swamps and patches of wet ground which dot this coastal belt, tanks quickly bogged down. No complete answer to the bunker of the type forming the main Japanese fortification at Buna and Sanananda has yet been found. The tank is one which will only succeed in certain favorable conditions.

The Japanese defenders fought with desperate tenacity. At one point south of Cape Endaiadere it was necessary to fire several hundred rounds of small-arms ammunition into one bunker and throw a dozen hand grenades into it before the three Japanese inside would cease fire. To destroy these bunkers after an advance has been made, our troops used to throw petrol over them and set fire to them. One of them burned for five minutes and then some Japanese who had been hiding in its deepest recesses ran out and tried to fire their weapons. For days afterwards in that coconut plantation Japanese survivors who had hidden in bushes and trees sniped at our men, especially when they walked alone. Indeed, in all these Papuan operations

no area that we have occupied was safe for many days afterwards. Japanese continued to pop up in unexpected places and if they had arms they would use them. There was no thought of surrender. This willingness of the Japanese to fight so desperately made the whole campaign more protracted and more costly in life.

The Sniper's Bullet

Fighting was fierce and bloody. It might be described as trench warfare without visibility. Snipers on both sides were active. In all forward areas there was that sub-conscious tension which came from not knowing exactly where the enemy was. The frequent ping of the sniper's bullet heightened this tension. Men of the A.I.F. recalled with nostalgic affection their campaigning days in the Middle East.

Not only was the actual fighting grim. Conditions of life were grim. White men in Papua lived in a way which even the fuzzy-haired Papuan natives disdained. At night they lay on the bare ground on groundsheet, bitten by mosquitoes or the still more pestilential sandflies. They were more often wet than dry—wet with sweat or from tropical downpours or from wading through the brackish mud of swamps, sometimes wet from all three. All drinking water had to be chlorinated, but often the sterilizing outfit had been forgotten or was not at hand. Scratches and sores would fester quickly into sacks of yellow pus and refuse to heal in the damp climate.

Rations, although better than they were coming over Owen Stanley Range were nevertheless simple and monotonous—cold bully beef from tins, tepid bully beef stews, army biscuits, and curried rice. Man's resistance soon becomes lowered in Papua. He tires easily and becomes a prey to malaria, dengue, scrub typhus, and dysentery. Civilization, too, feels a terribly long way away in North Papua, much farther than it did in the desert, and men are absurdly grateful for news from other parts of the world.

Gran Chaco Parallel

Before criticism is made of the slowness of progress in North Papua full account must be taken of the above factors. It must be appreciated that this Papuan campaign was possibly the worst fought by white men in the present war. If a parallel were sought, it probably had more in common with the Gran Chaco than any other campaigns of recent years. The numbers of men engaged were nowhere as great, the stakes perhaps were not as crucial as on some of the other battle fronts of the world. But the fighting and conditions of fighting were just as hard in their peculiar way and probably harder.

Moreover, it is no secret that Japanese resistance proved harder than was anticipated. We under-estimated the number of Japanese involved, their physical condition, their morale, and the strength of the improvised fortifications which they had constructed. We expected it to be tough going, but not as tough as it turned out to be.

One thing, however, is certain. If life was hard for the allied troops, it was no picnic for the Japanese either. They were facing the same conditions as we were—conditions to which they are not naturally adapted either. They were bombed and shelled regularly. They were cut off from any regular source of supplies. The net slowly drew more closely around them.

Speed and Maneuver

[An article by Captain P. Olender, Soviet Army. Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from the Russian in *Krasnaya Zvezda* 5 December 1942.]

After the German defense line at the bend of the Don was breached, the enemy was surrounded from the flanks and rear. Having suffered several defeats here and having lost a series of points of resistance, the Germans began to withdraw to the east toward their grouping at Stalingrad. However, on the west bank of the Don they had control of bridgeheads, inhabited places, and heights along the river. With their remaining forces the foe hoped to hold back our troops and permit their motorized units to withdraw beyond the Don. At one point a motorized regiment succeeded in breaking away from our infantry. The situation arose wherein this regiment might unite with its principal group and save its matériel. In order to prevent this, a tank unit commanded by Lieutenant Colonel Nevzhinski was dispatched to pursue the hostile motorized regiment. The problem was to break through to the rear of the withdrawing opponent to his bridgeheads and cut off his road to the crossing.

The German motorized regiment withdrew behind a chain of hills, on which the defense positions were located. Our tank unit and the motorized battalion assigned to it encountered strong antitank machine-gun fire here, and came to a halt. In war much depends on the initiative of the men. If the stratagem does not succeed in taking the enemy, another one must be employed immediately. In the given distance, the breakthrough at the rear of the enemy into his defensive positions was not successful; it was necessary to find some other means of seizing the important positions at the bridgeheads.

Our tank troops were facing six hills. In front of the heights were mine fields, covered with the fire of the antitank artillery. To the left, where the tank troops were trying to break through behind the retreating motorized regiment, the Germans had an especially well-organized antitank system. Here the deep ravines were a serious handicap for the tanks. Lieutenant Colonel Nevzhinski did not know what system of defense the enemy had on the right flank. Hurrying over with some officers and reconnoitering hastily, he became convinced that the enemy was weaker there. However, all the enemy would have to do would be to detect the shifting of our forces to the right flank, and he would undoubtedly move his own units to that place. This was all the more probable because the Germans had motorized artillery. Consequently it was necessary to deceive the Germans, to draw their strength still more to the left flank, and then to shift the main mass of the tanks inconspicuously to the right and strike an unexpected blow at a new spot.

The Lieutenant Colonel called the officers of the battalion by radio and ordered the start of the movement to the height on the right. The units had to go up a ravine which lay at the rear. Three tanks were to continue feigning attacks on the left flank. The mortars and antitank guns were ordered to open fire at the region of the river crossing, in order to delay the retreat of the German motorized infantry.

Literally in a very few minutes after Nevzhinski had given the order by radio, its execution began. Of the three tanks

left for the feigned attacks, only one was in working order. The others had some trouble. These tanks maintained fire from stationary position, and the undamaged one ranged between them, running to right and left, hiding in the ravine, appearing for a moment to shoot, then hiding again. The small amount of motorized infantry left here did the same. At times this whole group moved forward a few yards. As soon as the enemy increased his fire, the group halted, took shelter in the depressions of the area, and carried on intensive fire. The Germans evidently had the impression that our tanks and automatic riflemen were re-grouping. For this reason their entire attention was attracted to that spot. The roar of the motors and the cannonading disguised the actual re-grouping of Nevzhinski's units. That is why the appearance of tanks and motorized infantry on their right flank was a great surprise for the Germans.

The thrust was delivered on the move. The tanks broke through the hostile defense. The greater part of them moved in the direction of the crossing. The other tanks and the motorized infantry started to mop up the heights. It was necessary to do this rapidly, in order to come to the help of the group involved in the struggle for the crossing and the inhabited place located near it.

Also at this stage of the battle Lieutenant Colonel Nevzhinski displayed great skill and cunning. Behind the range of hills was an elevation occupied exclusively by enemy infantry. Although this hill was somewhat lower than the others, at the moment it was the key to the situation. From there it was easier to strike at the point of resistance disposed against our three tanks which were carrying out the false attack. Since the height was de-

fended only by infantry, our tank troops took it very quickly. From this point they attacked the flank of the principal enemy group defending the hills. Eight self-propelled enemy guns fell before the fierce attack of our tanks, crushed by their treads. The crew of the ninth gun fled. At the same time our motorized infantry and a few tanks moved along the hostile trenches from right to left. The men used grenades, automatic rifles, and machine guns on the enemy.

This well-directed thrust permitted the speedy defeat of the Germans occupying the bridgeheads. Those of our tanks active here were released and went at once to the crossing, but from the left, and not from the right, as the main unit had done. The tanks active at the crossing up to now, and those in the village, were pressing the fleeing Germans, and the motorized infantry was shooting them. The resistance of the enemy was gradually becoming weaker. Abandoning matériel and machines, the Germans tried to race across the ice to the opposite shore. But the ice broke and they fell in, only to be shot by our soldiers. The thrust of our tank unit from the left flank completely demoralized the enemy. Only insignificant remnants of the German motorized rifle regiment made their way to the east shore of the Don.

By such activities of our tanks the enemy's bridgeheads were disrupted on a front of nine to ten kilometers (four to five miles). Infantry units which had come up rapidly began to deploy at once along the bank. On the following day the enemy's bridgeheads fell. Our troops had the chance to force the river, and they successfully accomplished this task.

What is the vital factor in Lieutenant Colonel Nevzhinski's actions? First, his ability to size up the situation at a glance and to make the proper decision is outstanding. Then the speed with which he effected his maneuver and his accurate direction by radio deserve every praise. There is no doubt that these qualities in themselves enabled the Lieutenant Colonel to fulfill the task confronting him.

Mechanized Reconnaissance— Outline of a Tactical Theory

[Reprinted from *The Fighting Forces* (England) December 1942.]

The original article carried at its head a statement to the effect that the author, Major E. H. D. Grimley, British Army, was expressing his personal views.—THE EDITOR.

I—The Birth of the Reconnaissance Corps

When mechanized divisional cavalry regiments were absorbed into the Royal Armored Corps, divisional commanders improvised their own *mounted infantry* by the creation, from their own resources, of semipermanent organizations consisting of infantry carrier platoons, infantry antitank guns and medium machine guns. In many instances these were christened *forward bodies*.

These *forward bodies* performed a function which was a compromise between the role of the advanced guard and that of the advanced guard mounted troops.

It is now over eighteen months since the need expressed by those *forward bodies* has been recognized by the creation of the *Reconnaissance Corps*, whose regiments and independent squadrons have now more than taken the place of the old divisional cavalry so

rarely, in practice, allotted exclusively to any infantry division.

II—Organization of the Reconnaissance Regiment

Before considering reconnaissance tactics it is necessary to understand the composition and characteristics of the scout troop and how it fits into the reconnaissance squadron.

The scout troop, commanded by a subaltern in a carrier, has car and carrier sections. The light reconnaissance car (or *armored car*) section is made up of car patrols. The troop sergeant and a despatch rider are mounted on motorcycles.

The scout troop is very strong in automatic weapons, and has its own supporting and protective weapons in the shape of 2-inch mortars and antitank rifles. Intercommunication is by wireless, the sections being linked to troop headquarters.

In each reconnaissance squadron there are scout troops and a motorized assault (or infantry) troop.

Squadron headquarters are linked to regimental headquarters by wireless.

MILITARY REVIEW

Scout squadrons are supported by heavier weapons of H. Q. Squadron.

III—Tasks: Seizing, Protection, Reconnaissance; But the Greatest of These Is Reconnaissance

The normal tasks which a reconnaissance regiment may be called upon to perform can be summarized under the headings *Seizing and Holding, Protection and Reconnaissance*. Of these, the last requires the greatest skill and calls for the most difficult combination of boldness and caution. It is the subject of this article, which will attempt to outline a tactical doctrine primarily suitable to reconnaissance but adaptable to any task which is set.

Before proceeding farther, however, it is necessary to state the principle, so frequently disregarded, that the tasks of reconnaissance and protection cannot be successfully combined. Protection demands concentration and the blocking of approaches open to the enemy. Reconnaissance requires dispersion and freedom to deviate from routes being used by the enemy. If the reconnaissance regiment is to reconnoiter, therefore, the task of protection must be given to the advanced guard, forward body, or other protective detachment.

This principle governs this article, which is written in the belief that, although reconnaissance provides, by its very nature, a measure of protection, and although protection similarly provides a measure of reconnaissance, the term *protective reconnaissance* is an unhappy marriage of words which, although sympathetic, are incompatible in implication and should be divorced from each other.

IV—What the Divisional Commander Wants to Know

What, then, is reconnaissance from the point of view of the divisional commander whom the reconnaissance regiment serves?

Broadly speaking, it amounts to seeking and supplying the answers to the following questions:

- a. Where are the enemy's most advanced elements?
- b. If halted, where is the hard core of the enemy's outpost zone?
- c. If moving, which routes are being used by the enemy's advanced guards (or other protective detachments) and by his main columns?
- d. What enemy units are opposed to us?

V—Tactical Disposition of Reconnaissance Squadrons

The reconnaissance regiment must move with one or more of its squadrons forward. Each of these squadrons can deploy one or more scout troops, keeping the remainder and its assault troop in reserve. Thus the regimental commander has at his disposal a number of *probing forks* each with flexible and telescopic *prongs* available.

The method of using these *forks* is a controversial subject on which there are, again speaking broadly, two schools of thought—the *Bald-headed* school, which makes a fetish of *fighting for information* and advocates moving always at maximum speed, meeting the enemy head-on, and relying on fire-power and momentum to pierce his reconnaissance and protective elements, and the *Cun-*

ning school, which prefers evasion of the opposing reconnaissance and protective troops and use of mobility and fire-power to *probe* for information and to *fight for identification* if fighting should be necessary.

This article favors the *Cunning* school and suggests a technique for the art of probing.

VI—The Art of Probing

The art of probing must be considered from two aspects—that of a stationary enemy and that of a moving enemy.

In the first instance, having evaded, outwitted, or brushed aside the opposing reconnaissance elements, probing must clearly take the form of offensive thrusts across the whole extent of each scout troop's zone of reconnaissance until as clear a picture as possible of the enemy's outpost zone has been obtained. This method of probing requires skill and boldness but is outside the scope of this article.

In the latter instance, where movements of enemy columns are canalized into a limited number of roads, probing will be most effective if carried out from a flank, cutting across any or all of the roads in use. This method demands the evasion or penetration of the opposing mobile screen—evasion obviously being the cheaper alternative—and the establishment of a series of reconnaissance bases close to each road to be examined.

VII—The Reconnaissance Base

Evasion or penetration of the opposing mobile screen having been effected, the scout troop moving along its own axis will sooner or later meet more formidable columns using the same route. Offensive action against these would undoubtedly cause some delay to the enemy but would almost inevitably result in elimination of the scout troop—a heavy price to pay for the identification of (say) one unit.

It is at this stage that the troop leader will apply the principle of the reconnaissance base. In other words he will select, on one flank of the route, a locality which offers concealment and more than one means of ingress or egress. From this base he will send his silent-moving armored cars to *tap in* on the enemy's axis; and from this base, when the time is ripe, he will launch harassing attacks with intent to gain identification. When he has obtained the information he requires or when the security of his base has become jeopardized, he will move along the flank of the enemy axis to another base selected from the map and reconnoitered, if possible, by the armored cars.

VIII—Reconnaissance Tactics Summarized

The picture we have, therefore, is of a number of scout troops, or *prongs*, each on its own axis, feeling for the enemy within the bounds of its *zone of reconnaissance*; of evasion or penetration of the opposing mobile screen; of a further feeling forward until the heads of the enemy advanced or main columns are met; and then of a series of probing operations against these columns from a succession of defensible localities offering scope for maneuvers.

IX—The Principle of the Reconnaissance Base Applied to Other Tasks.

When a reconnaissance regiment or squadron is given a protective or seizing

or holding task, it is often expected to operate on a front so wide that denial of ground to the enemy throughout its extent is out of the question. Under these circumstances the only feasible method by which the regiment or squadron can fulfill its tasks is by a form of offensive defensive—that is to say, by locating the enemy's line of advance and then attacking, or harassing, him by fire.

It is suggested that the principle of the reconnaissance base is again applicable; these bases, concealing carrier sections, antitank guns, mortars, and/or assault troops, being sited at defensible nodal points while the armored cars act as standing or moving patrols watching the approaches within each *zone of responsibility*.

X—Form of Orders Adaptable to All Tasks

The following headings under the method portion of verbal orders are offered as suitable for launching reconnaissance squadrons or troops into action in any role. All will not, of course, be required on every occasion.

METHOD:

1. Order of March.
2. Start Points.
3. Times past Start Points.
4. Axes (Center Lines if preferred).
5. Zones of Reconnaissance (or Responsibility).—Usually marked on maps or given as inclusive or exclusive the various axes, or, when the time presses, as so many miles each side of axis.
6. Bounds.
7. Action on Bounds.
8. Report Lines.
9. Manner of Movement.—Given as "bold," "normal," or "cautious"—or, if preferred, as "green," "amber," or "red." Each has its definition known to recipients of orders.
10. Degree of Search.—Given as "close" or "cursory." Each has its definition known to recipients of orders.
11. For Limit of Reconnaissance.
12. Action on First Contact.
13. Special Instructions.—Any instructions not covered by the above to adapt the action to the task, should the task be any other than reconnaissance, e.g., squadron or troop boundaries on objective if the *intention* expresses a seize-and-hold-role.

XI—Conclusion

Although the reconnaissance regiment may be called upon to perform a variety of tasks, its method of approach will be much the same in all events. The aim, therefore, should be to standardize the method of approach, thus simplifying training, and to practice the variations which will adapt this method of approach to the job in hand.

The heading for orders given in the preceding section suggests a standard method of approach adaptable to all occasions, and the principle of the reconnaissance base offers a peg on which to hang the framework of troop tactics.

Command of the Infantry Company in Battle

[Reprinted from the article by Lieutenant Colonel F. D. Rome, Royal Fusiliers, in *The Fighting Forces* (Great Britain) February 1943.]

It is a widely held, and generally accepted view that commanders on the lower levels can retain but little control over their subordinate commanders, and through them, over their troops once battle is joined, and that the only way in which they will normally be able to influence the battle is by the employment of their reserves.

This view has achieved the status of a fact.

Emphasis in the training of junior leaders has accordingly been laid on the necessity for careful reconnaissance, planning and issue of detailed orders before committing troops to an operation, as thereafter no change of plan will be possible owing to this accepted lack of control. To this may be attributed to some extent the general "stickiness" of British troops in deployment and battle so noticeable in peace and in the early days of the present war.

This theory, as opposed to "fact," is based to a considerable extent on accumulated experience and some of the more important reasons usually put forward in substantiation are as follows:

"The fog of war."

The occurrence of the unexpected or unforeseen.

Casualties among leaders resulting in temporary disorganization on various levels.

The rapid tempo of modern operations.

The fluidity of modern infiltration tactics which avoid the rigidity of more stereotyped methods, which at least ensured a measure of control by imposing rigid timings, start line, axes of advance and boundaries on units and sub-units.

The actual loss of control in battle is directly attributable to two definite factors, however brought about. The first is the failure, for whatever reasons, on the part of troops actually engaged with the enemy to pass back information on which the commander can make further plans to achieve his immediate object. The second factor which prohibits the exercise of adequate control is the lack of direct communications between senior and subordinate commanders which prevents the passing and receiving of orders quickly enough for them to be appropriate and effective.

The thesis of this article is that both these factors are avoidable and must not be accepted as inevitable, as is done by many junior commanders.

It is proposed to consider this theory on the level of the infantry company commander, but the principles apply, with appropriate modification, on higher and lower levels also. The arguments that will be put forward are that this loss of control is attributable to a directly different set of reasons to those maintained by the majority, and are as follows:

An insufficient standard of training of both junior leaders and troops.

Failure to make full and proper use of the communication system now provided.

Failure to move with the times, to think out problems for oneself, and to experiment.

Adherence to and unquestioning acceptance of out-of-date ideas formed un-

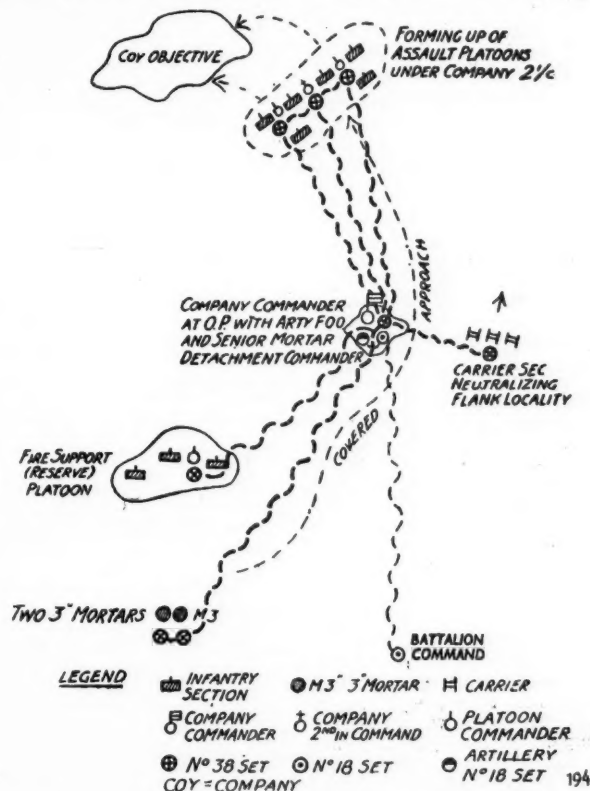
der different circumstances and only applicable to obsolete organization and equipment.

Let it be said at this stage that the following suggestions for retaining adequate control have not been proved in battle by the author, but have been tested on training in circumstances approximating as closely as is possible to battle. They are therefore only put forward as a basis for further experiment by those who are in a position to do so and who are not prepared to accept this loss of control "lying down."

Three assumptions have been made as a basis for devising some method of control, and it is hoped that these will be accepted at least in general, if not *in toto*. They are as follows:

First, the very adequate R/T (Radio Telephone) equipment now provided in infantry units and sub-units consisting, as it does, of No. 18 sets for communication between Battalion Headquarters, companies, and the Mortar and Carrier platoons, and No. 38 sets for inter-communication within these sub-units.

Secondly, that infantry, except under abnormal circumstances and in specialized operations, will not fight on their own, but will invariably fight as part of a combined "combat team," always supported by artillery and usually by tanks.



Thirdly, that modern infantry tactics are based on infiltration, envelopment and encirclement and eventual destruction of the enemy, thereby postulating much "loose" or fluid fighting in which there is no rigidity as regards timings or use of ground by sub-units.

It is now necessary to re-examine the reasons for loss of control in greater detail before attempting to formulate a remedy.

First, the failure of the subordinate leaders in contact with the enemy to keep the commander in the tactical picture. As applied to the case under review this means the failure of the company commander to supply the battalion commander with information.

Generally speaking, the reasons for this are:

a. Omission to train platoon and section commanders to report information automatically and continuously, and to insist on them so doing on all occasions.

b. The company and platoon commanders separating or divorcing themselves from their R/T communications for prolonged periods during operations, usually due to the urge to control the battle at the closest possible quarters in person.

c. Insufficient proficiency in the use and maintenance of the R/T equipment provided.

The reason for the second cause of control, that is to say the lack of direct communication between the battalion and company commanders, and between the company and platoon commanders, is as follows, and it will be apparent that it is one of those reasons given above for failure to transmit information.

It is the failure of the company and platoon commanders to keep their R/T sets with them at all times, and the tendency to "float" about the battlefield

under the conviction that their task is to be present in person at every critical place at every critical time, and to themselves lead, exhort, and otherwise play a leading part in the battle with pistol, tommy-gun, grenade, bayonet or any other weapon favoured. Such conduct

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effectively nullifies any possibility of control within the company and consequently within the battalion.

The company and platoon commander who discharges his function in this manner is too closely involved to perceive the larger picture; he is too busy using or attempting to get the chance to use his selected weapon, to either receive or transmit on his R/T, and will get killed or wounded at an early stage in the proceedings.

This frame of mind is admirable in many ways and is almost universal among inexperienced and youthful company commanders of today, but it is suggested that it is anachronistic and totally inapplicable to modern fighting and must be discouraged by any battalion commander who wishes to gain his objectives and at the same time do so without undue loss of life and equipment in his battalion.

Infantry tactics are based on fire and manoeuvre.

A very normal pattern of the infantry company in the attack will be for one platoon to provide the small arms fire support for an approach and assault by the two remaining platoons.

The fire support nowadays, in the case of a forward company, may in addition to the fire of the infantry company weapons include the fire support of up to a battery of field artillery, called for through a F.O.O. (Forward Observation Officer) attached to the company, the fire of two or more of the battalion 3-in. mortars, the fire of a section of Bren gun carriers, and often the fire of M.G.s. of supporting tanks.

The correct application of this fire power alone makes movement on the battlefield possible and can be regarded as the hammer which drives the nail of manoeuvre, or the assault, into the plank of the enemy defence.

The control of this fire power therefore takes precedence over the control of the manoeuvre element, the assault, in that no approach to assaulting distance is possible without it. If this is accepted it is only logical to insist that the fire support is controlled by the company commander himself and that the coordination and leading of the assault is delegated to the company second-in-command or to one of the platoon commanders involved.

The company commander who "floats" about the battlefield, divorced from his R/T communications to his F.O.O., his mortar detachments, his carrier section and possibly his supporting tank squadron or troops commander, and whose main idea in life is to lead the assault in person and to be the first to show blood on his bayonet fails to realize his true responsibilities. Through adherence to ideas which were entirely appropriate in the Peninsula or Crimea he will not only fail in his task, but he will deprive his troops of the fire support essential for their success and survival in battle.

The writer is fully aware of the psychological value of the physical presence of commanders with their troops at critical times and places, and when these occur the company commander may well decide that his presence in person is of greater importance than his effective control of the fire support available, and he must exercise his judgment in this respect; but to lead his troops in person as a normal practice and on all occasions is not only anachronistic but will not achieve his object. It may be argued that the company second-in-command should control the fire and so free the company

commander to control and lead the assault, but if we admit that fire power is the only thing that makes the assault possible, then the company commander is not in fact commanding if he devotes himself only to the subsidiary efforts of his assaulting platoons. Furthermore, he relinquishes control of his supporting, or reserve platoon to the second-in-command, as he will obviously be unable to control it himself.

It is now appropriate to examine the methods by which the control of the two elements of fire and manoeuvre can best be exercised through the existing machinery and organization of company H.Q.

Company H.Q. in battle consists of some fourteen individuals: the company commander, second-in-command, C.S.M., (Company Sergeant Major) two batmen, three orderlies, signallers and stretcher-bearers and attached personnel, such possibly including a F.O.O. in his armoured O.P. (Observation Post) and the senior of the two mortar detachment commanders.

If any attempt is made to move and function as a whole, immediate restrictions are imposed as to where and over what country company H.Q. can move. If it is agreed that the battle contains two distinct, though closely related, elements, each needing control, then it is only logical to allot to the two "controllers" the machinery necessary for them to exercise that control and it is suggested, therefore, that company H.Q. normally be split both as regards functioning and movement as shown diagrammatically above.

The major portion of company H.Q. remains at the disposal of and under control of the company commander and provides the machinery for the coordination of the fire support with the movement of the assault element. A smaller, or advanced H.Q. is thrown off and is placed at the disposal of the second-in-command of the company, who is controlling the assault element under the direction of the company commander.

This layout can function static or moving according to the length of the advance, ground and other factors. It will be seen that in this layout the company commander is in touch with both his assault element under the company second-in-command, and also with his fire support element consisting of artillery, 3-in. mortars reserve or support platoon and carrier section, and is also able to pass information to and receive orders from the battalion commander.

Another forward company may be on the same R/T net.

The fact that the No. 18 and No. 38 sets can be netted on the same frequency permit various other commutations and permutations as regards netting, and there is much field for experiment in this connection. It is in no way suggested that the diagram depicts the only or best method of netting sets. As regards movement the company commander must move between predetermined bounds and on a pre-selected and pre-notified route. If for any reason it is necessary to change this route the company commander must notify all concerned by R/T or runner. This is necessary to ensure that orderlies, liaison personnel from the battalion intelligence section, and others sent forward for any specific purpose, know where to find the company commander without delay. It is now appropriate to make a final suggestion that may on first consideration be received with consterna-

tion and alarm, and this is that the company and platoon commanders and company second-in-command should themselves carry the No. 38 sets and wear the headphones and throat microphones themselves continuously, and up to the last possible moment in an attack. Only in this way will they remain automatically and continuously in the battle picture. By so doing they will hear every exchange of information and every issue of orders connected with both the fire support for, and movement by, the company, as it takes place. They cannot get separated from their R/T; they will not miss exchanges of information which are of vital interest to them, but which an orderly or signaller will not repeat to them if not actually addressed to them; there will be no time lag in the passage of information or orders and mutual support becomes simplified and automatic between both the assault elements and the supporting elements. The weight, method of carriage, and operation of the No. 38 set impose little restriction on the freedom of movement of the individual, and the throat microphone leaves the hands free.

The writer submits therefore that if troops and leaders are properly trained, and if full and intelligent use is made of the R/T equipment provided, there is nowadays no excuse for loss of control in battle.

This means that both the assault and fire support elements can be controlled during the battle to deal with the unexpected and changing situations during the attack.

It means that troops can be launched into battle with every chance of success, with less ample reconnaissance and less detailed orders, so saving invaluable time.

If it is in any way possible to achieve these objects, or even one of them, by such methods then experiment and trial becomes a duty.

The main difficulty anticipated is that of weaning the company commander from the "blood-on-his-bayonet" school, particularly so when his experience is confined to training where bullets and shells are imaginary and not realities. Without experience it is very difficult for either junior leaders or troops to realize that any movement by them on the battlefield will depend entirely on the accurate, timely and rapid application of the support of artillery, mortars and small arms on to localities which, without such neutralization, will bring movement to a standstill and inflict heavy loss on the assault elements. With the establishment of field-firing ranges suitable for all arms it should not be impossible to drive the vital fact home amongst both leaders and troops if imagination and ingenuity are applied and to borrow from Mr. Jorrocks his considered verdict that "fox 'untin' is the image of war"; the difference between controlling a battalion trained on these lines and one in which no such system pertains is analogous to the difference between riding a handy, well-schooled, hunter and a pulling, hot-headed and inexperienced racehorse in the hunting field.

The latter may have speed, ability to jump, courage and fitness, but the increased strain, wear and tear on both horse and rider, and the increased possibility of disaster due to lack of proper control at the critical moment makes the properly schooled and more easily ridden hunter a far better proposition when it comes to seeing the end of a hunt.

Two Years Ago in the West

Hours of Decision

[An article by Captain von Vietinghoff, German Army. Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from the German in *Die Panzertruppe* September 1942.]

This article gives a good description of an actual combat and is included in the Military Review for that reason, even though it has much typical Nazi braggadocio throughout.—THE EDITOR.

It was mid May . . . In the forenoon Maubeuge had been taken in a bold *coup de main* by the 2nd Battalion, and the 3rd Company of the "Red Devils" had repulsed a desperate counterthrust by the enemy. A short stubborn duel between two tanks at 80 meters (about 87 yards) brought the final decision. Fast and furiously the two adversaries hurled their AT shells at one another. Everything was at stake. A hundredth of a second's advantage won over the adversary had brought victory. Proudly, the Model IV tank had been able to report by radio: "The last enemy resistance broken; the armored enemy crushed."

But there is no halt for the armored arm. It is the same as in the case of an express train—a minute's stop, then it travels on. And that was the way matters stood on that hot day in early summer.

We were to go to the direction of Valenciennes! Across the fields we—the 3d Company—went with our heavy tanks ahead. On the highway our columns came to a halt. I asked the reason and learned that our reconnaissance had run into the enemy just outside the village of Villereau.

My commander was at the moment in conference with some of the higher officers. Therefore I had to make my own decision. I did not have any reflections to make. All we had to do was "Drive ahead past our own columns: drive ahead for purposes of reconnaissance!"

We were not to be stopped by the great difficulties of the terrain and after just 40 minutes time the Company succeeded in making contact with the commander of the battalion 3 kilometers (about 1½ miles) outside of Villereau. There was a brief discussion of the situation. I submitted a proposition. The commander agreed and immediately the orders were given to the platoon leaders.

Scarcely two minutes later the big, clean-cut Model IV tanks of the 1st Platoon were on their way after the enemy.

Where was he? Where was his devilish AT artillery concealed?

These thoughts were running through the mind of each of the tank men. Everyone knows that in close fighting between tanks and AT artillery, that side comes out the winner that has the best nerves, is quickest, and whose shots take effect first.

My ears listened tensely to the clatter of the tank treads of the departing platoon.

Suddenly—I was already beginning to get uneasy—I heard three reports from one of our Model IV tanks and immediately afterward received the radio message: "Enemy AT cannon put out of order; enemy retreating by way of Villereau; 1st Platoon is after them." The moment had now come for the entire company. Quickly we caught up with our leading tank. In joint assaults the enemy was soon driven far back beyond the village.

In my role as commander I spent a little while orienting myself anew with respect both to terrain and situation. Up ahead I perceived clearly that the enemy was retreating. But what was that over there on the left? I suddenly caught my breath; scarcely 1200 meters ahead, I saw the enemy hurrying out of Le Quesnoy at a rapid pace with tanks, AT artillery, and infantry. All his movements came to an end in a woods so—he was intending to get at our flank!

A thousand thoughts and reflections coursed through my brain: would the enemy be able to annul our valuable victories? He must never, never succeed in doing this. He would still get acquainted with the "Red Devils."

I was seized with raging anger against these niggers. All day long they had lain opposite us with their red fezzes. Today there would be a clear, unmistakable decision made! They would get acquainted now with our concentrated "will to annihilate."

It took just a few short words to get the company in the correct frame of mind. The code names for the platoons were already engraved on the brains of the radio men; they had no further use for radio code tables. "1st Platoon go around the woods to the right; 2nd Platoon, on the left. Commander's tank with Company Headquarters Detachment in the center. March time; after the enemy," this was the order. From this point on, the company continued to operate almost automatically. The experiences gained in many a fight rendered it unnecessary to give many orders. Everyone already knew just what he was to do.

I had a good view from my turret. Widely deployed, the tanks rushed at the enemy. Automatically the left platoon came to a halt ahead of the first stretch that we had to traverse in order to take up fire protection. The rest of us drove ahead. The enemy's shells were now striking to right and left of us. One could see the dry dirt spurting up all over the field where the shells from the AT cannon were striking. But what did we care about that! All we knew now was our objective; we had to reach it.

The platoon under F . . . had now deployed to the right. It had the difficult task of helping in the protection of our right flank. I heard the well-known roar

of our good old AT cannon. More and more violent the firing became. Soon it was impossible to distinguish whether it was the sound of our own guns or the bursting of the enemy's shells.

In my tank the heat reached the boiling point. Fifty degrees (about 112 degrees Fahrenheit) and more, mixed with the powder smoke and the smell of burned oil, the poisonous-smelling gases coming from the steering apparatus turned the tank into a regular hell. The hands of the driver gripped tenaciously the softened rubber of the control stick. Covered with grime and with his face running with perspiration but with a clear calm voice the radio operator in his hot and narrow hell was sending message after message.

His gaze tense and his eyes already bulging from the hour's exertion, my unshaven gunner peered through the sights. Oh, he is wide awake! Not a fly can escape him.

What was that over there? Driver, halt! Out with the field glasses. Those were four enemy tanks! But I was yet too far away.

Like a fox, we slipped up on the tanks. We found a favorable hedge and worked our way forward along it. We had good observation over the course it followed. But it is always a wild trip along hedges! That is always where the accursed AT cannon are located. But we knew how to manage it.

We moved slowly past the corner but took the curve at highest speed. Finally we were within range of the enemy tank. "Cannon, 800 meters; enemy tank; fire!" We fired salvo after salvo as if on the drill ground. The first of the tanks was now on fire. Now I also saw the crew of the second climbing out. It too must have been hit. Suddenly I heard a terrific explosion behind us. A cold flash passed over my body. I guessed what had happened. One of the tanks of F . . . 's platoon had been shot through the gas tank. A quick prayer passed our lips: "Lord, save our brave crew."

Our mission called us again to our task of watching ahead. Now the Company Headquarters Detachment was also firing as hard as its guns would fire into the woods occupied by the enemy.

The enemy was no longer able to hold out against us. Wounded men were lying everywhere. The despairing enemy came out of their rifle pits with hands raised. The victory was ours. A happy feeling took possession of all of us as we reported back our proud success. One-half of an enemy battery, four enemy tanks, several AT cannon put out of commission. Long, retreating columns of the enemy were entirely broken up and annihilated. A flank attack by the enemy was repulsed.

Morale in War

[By Major G. S. Heathcote, R.A., in *The Journal of the Royal Artillery* (Great Britain) January 1943.]

This article attempts to dissect morale into simple constituents and from these to discover how best to raise the morale of the soldier. It does not intend to paint a gloomy picture of British morale at the present moment; but morale can always be raised and there are signs, which give the impression that the pride and bearing of Englishmen is not what it was before and during the last war. To quote from Daphne Du Maurier's book about the nation, "Come Wind Come Weather":

"I believe that the old English spirit is not dead. It still lurks in the hearts and minds of every man and woman in this island; but centuries of soft living, and thinking only in the first person singular, have made the spirit a shadow of its former self and the door that hides it is not easy to unlock. The present danger has come upon us as a challenge. Are we going to discover once again the old fundamental values; truth, honesty, selflessness, and learn

'to give' instead of the inevitable 'to get'? These are the only qualities that will give us courage and help us to endure."

The Military Application of Morale

The occasions when a soldier requires high morale in addition to the normal attributes of physical fitness and military efficiency, are particularly apparent in modern war and are:

a. The need in modern battle for soldiers to fight in small bodies and often alone.

b. The demoralizing effect of modern weapons.

c. The long periods of waiting for battle during which the soldier has all the temptations to avoid hard training and take the easiest and most comfortable path, to which must be added the efforts of enemy propaganda to put before the nation the "easiest way out," which is always of least value to the country.

In morale are the constituents which enable a soldier to fight steadfastly against fear, pain, boredom, and the enemy's will. Only troops of high morale can retain the initiative in battle. These constituents of morale can be summarized as follows:

a. Pride, pride of race, of regiment, and above all personal pride.

b. Complete faith in the cause for which we fight.

c. An unswerving fixity of purpose.

It remains to take these constituents in turn and to deduce methods of cultivating them in the soldier and the youth of the nation.

Pride

Pride is the flame which enables men to rise above the mediocrity of normal life, and to withstand the temptation to lose faith in their cause and fail to dedicate themselves entirely to achieving victory. To build up pride, each man must have a background of tradition and he must be able to feel that he is doing something effectual, of which to be proud. It is therefore necessary to give each soldier something tangible to live up to and to force him to make a continual effort towards victory, even during the inactive period of waiting for battle. The effect of this effort must be apparent to each man.

The following are the ways it is suggested that pride should be built up and sustained:

a. *The Example of Tradition.*—Existing examples are the teaching of regimental history and the B.B.C. (British Broadcasting Corporation) "Into Battle" series; but much more fervor must be behind the teaching, if it is to drown the effect of pre-war cynicism about empire building, military valor, and national pride itself. We are fighting a nation whose pride is largely based on military tradition; we cannot afford to overlook it. Every soldier must realize that he is directly responsible for maintaining the spirit and pride of his forefathers and that he should be thrilled and not embarrassed by the exploits of his nation in the past or his comrades in the present. We must regain the fervor which sent Drake and Frobisher on their journeys, and which made thousands cheer the King when the first world war was declared.

This fervor must start from the top and spread through normal channels to the soldier. Martial music must become a tonic to him, saluting a chance to show his pride in his calling. Such an attitude

exists in part, methods of improvement are not easy to catalogue; but there is much for Englishmen to be proud of and to emulate. It is the spirit which made great deeds possible that must be recaptured. From Parliament through the press and radio must come the example; from the War Office, through personal contact must come the instruction. Normal propaganda, lectures, A.B.C.A. (Army Bureau of Current Affairs), and films will help; but the smoldering embers must be fanned into flame by the example of leaders who have an almost fanatical faith in their cause.

The nation has made history in the past, individual Englishmen are making it now, their example must become a guiding light for all to follow.

b. *Tangible Results.*—Pride and satisfaction come from the knowledge, even though it be subconscious, of having made an effort towards a cause other than one's personal benefit. Before an army or organization can reap the benefit of pride each member must make a personal sacrifice. Pride in a smart regiment comes to those men who contribute by their own personal smartness; pride in victory is not easily given to those who have not taken part in the battle. It is essential therefore within the army, that every soldier should continually make an effort and he must realize exactly how this effort is helping towards victory or, in certain cases, towards the raising of the morale of his unit. The "Spit and Polish" so pilloried by the cheap press is an example of tangible results. A regiment which after battle or lengthy exercises can make the effort towards smart turn out, is a regiment of proud men. The effort will serve them well in battle, the smartness is plain to see. A proud man salutes at all times because he believes in his cause. Let us take notice of the timid salutes parsimoniously handed out by some of the troops that take their leisure in any garrison town on Saturday afternoons.

The rigid discipline of the pre-war regular army has been gradually relaxed in the interests of the individual good bearing of the civilian soldier. Now a firmer hand is necessary to show many young soldiers the errors of their ways. It is questionable whether the aforesaid concessions were ever appreciated or of value. Let us also revive a few of the symbols that were an efficacious tonic to the "old army"; bugle calls, colors, the beating of retreat. Has mechanization made it impossible for a unit to take its colors into battle? Great deeds have been done for a "tattered flag," perhaps of no direct bearing upon the immediate effort but a tangible sign of a regiment's spirit. Are not these tattered flags the symbols of that for which we fight, England?

The garrison of England, whether ready to repel the invader or in training, are part of ultimate victory. They must be made to realize the part they are playing is a valuable and necessary one.

c. *Personal Pride.*—The pride that makes for steadfast courage in battle and a generous truthful life in comparative peace of mind. This is the object of religious teaching. To get the nation to church must be of great value in raising morale; but the church has no longer the hold it should have on the minds of the people. The mysticism of religious teaching is too hard to reduce to its salient doctrines, to be absorbed by the hard worked youth of a nation at war. The objects and doctrines of religion can be summarized and laid out for all and for the soldier in particular to see in a form similar to the following outline:

"The Creator gave to humans two things which raised them above the animals: Firstly, a better brain and secondly, a subconscious mind or soul which at first vaguely, and later more clearly, realized that any society can only hang together by the unselfishness of its members. However hard a body of men work selfishly for the same object, they will fail, because they will fight among themselves. Religion is the original teaching of this fact."

It becomes more true every day that the doctrines taught by Christ are those upon which a nation must live its life and fight its wars. If these doctrines are understood by Englishmen, ultimate victory over a nation that has thrown them aside must be assured. They can be summarized as:

i. Unselfish dedication to the good of others and therefore to one's country, which brings with it avoidance of greed, intrigue, profiteering, and the like.

ii. Faith. From which comes courage and steadfastness in face of the enemy.

iii. Loyalty. The basis of all service and discipline.

iv. Truthfulness. Without which faith and loyalty must be null and void.

All these require an effort and all build pride. All applied in a realistic way are match winning factors in war.

Complete Faith in the Cause for Which We Fight

Pride with all its attendant values is not easily acquired if the nation does not know what is the ultimate aim of those who are leading us in war. The Atlantic Charter is the basis; but the soldier wants a more detailed description of the object for which he is fighting. The money and effort spent in achieving victory will also be used to raise the happiness of the country in peace. An imaginative and broad plan, encompassing work, housing, health, development of colonies and dominions, and the encouragement of emigration to them must be made and explained to the people and the soldier. The soldier must know that real and lasting plans are being laid to ensure that when victory is won he can be certain of an enduring peace. From the days of Charlemagne and before, the Germans have wrecked the peace of Europe at regular intervals. They must be finally and utterly subdued. Only such a policy will give real confidence to the nation.

An Unswerving Fixity of Purpose

The increasing power of modern weapons and in particular their demoralizing effect, coupled with the tendency in modern battle for individual soldiers to have to fight alone, often with the enemy having penetrated through and behind their position, has made high morale essential.

The individual soldier or tank crew, with few orders, is launched, often in darkness or smoke, to take his objective, while every effort of the enemy will be aimed at forcing him to take cover by lying down. He requires courage to overcome fear; but most of all the dash and power to think clearly that will enable him not only to overcome fear but to reach his objective without being killed. Plain courage is not enough. Only by the individual soldier can initiative be gained or lost, once battle is joined.

This fixity of purpose can only be taught by subjecting the soldier to trials of endurance and by asking more and more from him, when he considers his strength is exhausted.

A boxer's training is not completed without hard and painful fights after he has already completed a long "work-out." It is for this reason and because boxing is based on the classic principles of war, that it is recommended that boxing become an organized part of training for battle. No boxer won or lost a close fight without high morale.

Exercises, long or short, end at the advertised time, and the staff and troops key themselves up to last just that time. Battles have a habit of "lasting longer than expected, so must exercises. It is "that little bit extra" that every man can produce if he knows he has got it, which wins victories.

Steadfastness in the face of surprises and pain of war is not gained by stereotyped exercises. Exercises must produce their shocks and men must learn to think calmly in war. Too much competition in training however, leads to selfish fighting which can only result in failure. It is not every man for himself; but every man for his country and therefore every man must by his training and resultant morale think not only of himself but how he can assist his comrades.

Conclusion

Tanks, airplanes, ships, and guns have failed armies before. High morale has won many great victories. We fight an enemy whose morale is high. Ours

must be bred of proud and righteous men fighting for a just cause, if it is to achieve victory.

Few can deny that all the constituents of high morale can be instilled in man by strict and well planned upbringing from the cradle. Much of the nation has not had that upbringing. It remains for those who have, to reawaken these latent qualities.

While final results must come from a vigorous example passed down through all ranks of the army, the initiation by the directors of training requires much thought and organization. Chaplains, doctors, education officers, psychiatrists, all play their separate parts at the moment. None will be effective until they are co-ordinated and work in conjunction with regimental officers upon a clear doctrine. Their field of operation starts with the highest in the land and stretches to include perhaps most important of all the Boys' Training Associations. Morale is difficult to define; but its development can and must be detailed.

England is still rubbing the sleep out of her eyes from the rude awakening of war. If a bucket of cold water is needed to bring the sparkle back to her eyes and the spring into her step then let it be administered and let the army and its leaders, like Cromwell's army, be the creators of the new national pride that will do it.

A Reconnaissance Detachment in Liege

[From an article in *Militär-Wochenblatt*. Translated from German at the Command and General Staff School, Fort Leavenworth, Kansas.]

The material in this article gives a vivid account of reconnaissance activity; and for that reason it is being published here, though the action to which it refers is now old.—THE EDITOR.

During the rapid march through Belgium, the detachment had been repeatedly employed as an advance detachment. On the first day of the attack, it was important that the division should reach the valley of the Amblève. The detachment succeeded, in spite of difficulties, in pushing as far as La Gleise, according to orders, and in shoving security ahead in the valley as far as Stoumont.

On the second day of the attack, the division was anxious to capture Remouchamps in a rapid operation and to break into the La Reid position.

During the afternoon, after the removal of many barriers, some of which were very difficult to get out of the way, the detachment, which at that time was acting as advance detachment, succeeded in reaching Remouchamps which the enemy abandoned as our men moved in.

After performing a difficult mission of reconnaissance in front of the forts of d'Embourg and Boncelles, the detachment received orders to push on, as advance detachment for the division, through the as yet uncaptured fortification and advance as far as the Meuse-Ourthe sector south of Liege. Our mission was as follows: to prevent forces retreating from the fortifications, especially from Boncelles, and forces which might be coming up as reinforcements for the fortifications from the Liege area, from crossing the Meuse and Ourthe.

During the night the detachment succeeded in slipping between the firing works with almost no casualties and in

reaching Dugree and Angleur, suburbs of Liege.

On 14 May, shortly after the arrival of the detachment, a bicycle platoon supported by an antitank gun was ordered to capture the bridge across the Ourthe in the suburb of Chenée. The bridge was left intact by the Belgians. Late in the afternoon, this small detachment reached the position in Chenée. The remainder of the detachment did not follow until the late evening, and went as far as Angleur, in order to take over the bridges in this place also, after the Ougrée sector had been assigned to other units following parts of the division.

The population of Chenée had never seen any German uniforms. The aversion which they showed us was, therefore, genuine. The bicycle platoon with its antitank gun took up position beside the bridge and in the neighborhood of the Chenée railway station in circular formation. The cannon commanded the bridge and the roads leading to the Embourg fortress. The one great disadvantage of the position was that all around there were high inhabited houses and factory buildings which offered excellent places of concealment for sharpshooters and guerrilla fighters who had already fired on our men in Ougrée and Angleur. This had to be endured, however, for it would have been impossible to clear the people out of this mass of buildings and capture them in the approaching darkness, especially with so few men available for the task.

Night settled down on the group in this situation.

About 2:00 AM, as the moon was just going down, the Belgians brought heavy weapons from the fort and placed them in position. The hills surrounding the rail-

way yards and bridge were especially suited for this purpose. These hills were the continuation of the height further to the south where the Embourg fortress is situated. It was not long, however, until the enemy opened fire. In addition to this, bullets now began coming from open windows and from behind all the corners. Quite a show started and our antitank gun especially suffered considerably from the enemy. But the little advance detachment replied to the fire in such a lively manner that not a single enemy attack took place. With dawn the trouble came to an end. One man dead in the railway yards and a few wounded was all there was to remind us of the events of the night.

We took advantage of the daylight to improve our position and establish contact with the other security groups at the bridges in Angleur. Since in comparison with its size the detachment had an extremely large area to capture both from the north and from the south—including four bridges over the Ourthe and the Meuse—it was impossible for it to send any reinforcements to the bridgehead at Chenée, especially since the main feature of the situation as a whole, as understood by the detachment, was security against enemy approaches from the south while these bridges were located in the northern part of the sector.

Therefore, from the point of view of the weak detachment located at the Chenée bridgehead, it was a subject for rejoicing when during the day a detachment of engineers of the division engineer detachment arrived to mine the bridge and railway yards.

In this situation the second night came on.

The detachment was no longer fully acquainted with the general situation since it was impossible to establish radio contact with the infantry regiment to which at that time the detachment was subordinated. Particularly, the detachment was unaware whether or not Fort Boncelles had been taken. It was not until the late afternoon that reports came in from the reconnaissance troops which led to the false conclusion that the attack scheduled for Fort Boncelles by the division had been a success and that the fortress crew was attempting to work its way back toward Liege. This would cause them to meet with the south front of the detachment. It was not until the next day that the detachment learned that the attack had not yet been made on Fort Boncelles.

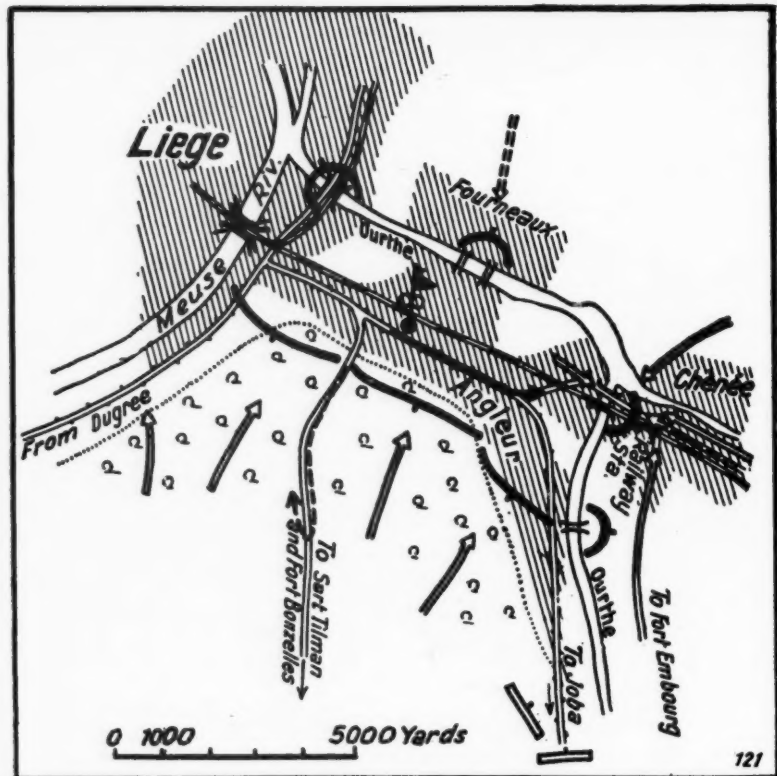
The scouting parties also reported the presence of regular Belgian troops who kept firing on them from everywhere in the forest region of Sart Tilman. Therefore the detachment reinforced its southern front, since at about 8:00 PM the report came in that the positions on the west shore of the Ourthe which were formerly unoccupied, were now occupied by the Belgians with antitank and machine guns. But since the detachment forming the bridgehead at Chenée could not be further weakened, especially since this bridge formed the main connection across the Ourthe between Forts Boncelles and Embourg, the reinforcements for the south front had to be taken from the other groups of the detachment who had occupied the other bridges at Angleur, though hostile scouting troops also continued to appear here.

While small enemy forces kept coming in contact with the south front of the detachment throughout the late evening and all night long, they were easily re-

pulsed. Again the enemy opened fire on the bridgehead at Chenée, though at first the fire appeared to be of no great consequence. It was only at 1:00 AM when the artillery fire became stronger at the bridgehead and a plane appeared to be directing this fire by means of parachute flares that it became doubtful whether the attack expected during the night would be against the north or the south front. Taking every known factor into consideration, either appeared to be possible since the enemy might plan to regain possession of the Ourthe and join forces with the troops coming from Fort Boncelles.

A short time later the enemy launched an attack against the bridgehead. On the bridge itself, a side-car motorcycle which had run into a mine was on fire. In the light of these flames, forms could be seen springing up everywhere and moving forward by bounds. The gun fire from the houses became considerably stronger. Besides all this, the steady fire of Belgian antitank guns could be heard, also the fire of machine pistols and artillery. The situation was becoming very critical for the small number of defenders. However, the commander of the bicycle platoon, the commander of the antitank platoon, and the commander of the engineer platoon had the situation under control as a result of their exemplary collaboration. With no regard for the heavy fire, they went calmly about their tasks. These three commanders assisted wherever there was need of their services. The commander of the engineer platoon hurled explosive charges at the enemy when they got dangerously close as if he were engaged in a snowball fight and in this way also took care of the enemy in a few of the nearby houses which were partly wrecked in the ensuing explosions. The fire of the little group of defenders was very effective. The small shells of the antitank gun followed one another through the darkness and the steady clatter of machine guns and rifles did the rest to convince the enemy that it was not easy to break into the bridgehead position in spite of the small number of defenders.

Between 2:00 and 3:00 AM, however, the situation became extremely critical; and suddenly the defenders of the bridgehead were attacked from the rear, from across the Ourthe. How the enemy appeared there, since the south front was holding, was at first a mystery. It later developed that these attackers were nearly all guerrilla fighters from the houses of Angleur who were now attempting, under cover of the buildings of the factory district, to come in from the northwest and attack the defenders from the rear, across the Chenée bridge.



Lieutenant Wirth recognized this before it was too late. He hurriedly swung his antitank gun around and sent explosive shells into the houses near the bridge on the other side. The effects were miraculous. The enemy speedily disappeared.

On the basis of information sent by scouting troops which had been dispatched to the south during the night, the detachment commander concluded that there was not much likelihood of an attack from the south and that the Belgians, who were constantly appearing in this area, were probably the scattered remnants of disintegrated Belgian units which withdrew earlier and were now attempting to cooperate with the Liege fortress and its defenses. Not until now was it possible to send an additional cycle platoon to reinforce the bridgehead at Chenée.

When this platoon arrived at the bridgehead, after a difficult trip through the mine barrier which had now been extended by the engineers to the rear of the bridgehead, the fire of the enemy

on the Chenée bridge was beginning to die down, especially the fire of the hundreds of guerrilla fighters. As day began to dawn, the situation was again fully in hand. The enemy ceased his violent efforts. Except for a few easily repaired injuries due to shells and mine explosions, the bridge was still intact.

Seven dead and numerous wounded men testified to the fact that in this city a small German combat force had fulfilled its mission and performed its duty well in spite of superior enemy forces.

Later on, through the examination of enemy documents, it was discovered by the infantry regiment which relieved the detachment that in the battle which we have described, a reinforced Belgian infantry battalion from Fort d'Embour as well as hundreds of guerrilla fighters from Chenée had been engaged, to say nothing of the many stray units on the south front which attacked the rest of the detachment. At the Chenée bridgehead on the German side not quite 80 soldiers, 4 light machine guns and 2 antitank cannon had been able to hold their own against them.

The principles of war are eternal, but the factors with which they have to deal are undergoing an incessant evolution.

—von der Goltz.

Book Reviews

LAST TRAIN FROM BERLIN

BY HOWARD K. SMITH

359 Pages . . . Alfred A. Knopf,
New York, N. Y.

"Last Train From Berlin" is as absorbing an account of Germany in war time as has been published during the present conflict. The author, formerly a Rhodes scholar at Oxford, has lived in Germany intermittently since 1936 and was in turn connected with the Berlin office of the United Press and later with that of the Columbia Broadcasting Company. In line with his work as a journalist and radio commentator Mr. Smith has enjoyed numerous personal contacts with important personalities in the official circles of the Third Reich, including the War Office, Foreign Office and the Propaganda Ministry, as well as with countless ordinary citizens of Nazi Germany.

Among the many things it takes up, none is more interesting to the military reader than Mr. Smith's admirable characterization of the German officers' corps and of the generals who constitute the high command of the German Army. Based on first hand observation they provide us with an unparalleled picture of the Prussian military caste which, under the Nazis, has regained the position it lost after 1918.

TURKEY

BY BARBARA WARD

121 Pages . . . Oxford University Press,
London, New York, Toronto.

Turkey occupies a natural position of such crucial importance that sooner or later the country seems destined to become involved in the great struggle of the conflicting powers that now completely surround it. For a concise analysis of Turkey's present position, this little book by Barbara Ward can be highly recommended. After a brief survey of the geography and history of the country, the author discusses the great need of modern Turkey—westernization. Earlier efforts at reform along western lines, at least to the extent of creating effective resistance to foreign powers, achieved little success before Mustafa Kemal (known after 1932 as Kemal Ataturk) became President and virtual dictator in 1923. Between that time and his death in 1938, Kamel revolutionized the country. Miss Ward deals with the basic changes in Turkish life and institutions in chapters on the political system, the social revolution, the village, and the industrial system. All this provides a background for an understanding of "Turkey in the Modern World," perhaps the most significant chapter in the book in the light of conditions today. The present relationship of Turkey both to the Axis and to the United Nations becomes clear and understandable in Miss Ward's discussion.

The author has lived for a time in Turkey, and as assistant editor of a London weekly she has been in a position to follow world affairs. Her small book provides an excellent introduction to Turkish problems and policies for the general reader.

WITH JAPAN'S LEADERS

BY FREDERICK MOORE

365 Pages . . . Charles Scribner's Sons,
New York.

After twenty years as a newspaper correspondent in Europe and the East, Frederick Moore accepted employment with the Japanese Foreign Office in 1921. For fourteen years he served Japan as "an authority on general information," striving always to give the Japanese a better understanding of America, and Americans a more balanced view of Japan's problems and policies. His periods of service covered the years 1921-1926, 1932-1933, and 1934 to the day of the attack on Pearl Harbor, December 7, 1941. However, his book deals lightly with the earlier years and goes into greatest detail on events of the period immediately preceding the outbreak of the present war when he was attached to the Japanese Embassy in Washington. Especially interesting and enlightening are his descriptions of the problems and personalities of the Japanese diplomats in these later years, struggling hopelessly with conditions beyond their control. In these descriptions it becomes quite clear that, in contradiction to the title of his book, Moore was not closely associated "with Japan's leaders." Japan was led by the military, and the military had no friendly feeling either for Moore or for their own diplomats upon whom they looked with utmost contempt.

Originally employed "to assist in maintaining and improving the good relations existing between the two countries," Frederick Moore continued to believe that war could be avoided between the United States and Japan even after the invasion of China, but when Japan joined the Axis on September 27, 1940, he rapidly lost all hope. His story reveals the steady deterioration of relations between the two countries. With their government completely under the control of aggressive expansionists, "the Japanese," says Moore, "must be defeated now or there will probably be no peace in the Pacific," and failure to inflict a decisive defeat can only mean that the United States will face "the burden of permanent and enormous armaments."

AMERICA'S STRATEGY IN WORLD POLITICS

BY NICHOLAS JOHN SPYKMAN

500 Pages . . . Harcourt, Brace & Co.,
New York.

Seldom if ever has our country's position with relation to the war-torn world been presented with greater clarity, deeper understanding or more profound and scholarly knowledge of the fundamental requirements of our national safety and interests. Without doubt, this is one of the most absorbingly interesting books, and should be widely and carefully studied by officers of all services. The work provides a tremendous source of information for lectures, such as are being given to military personnel throughout the Army.

The author is a Professor of International Relations at Yale University.

RUSSIA AT WAR

Twenty Key Questions and Answers

BY VERA MICHELES DEAN

96 Pages . . . The Foreign Policy
Association.

This latest of the Foreign Policy Association's "Headline Books" undertakes to provide clear and concise answers to many of the questions concerning Russia which are often heard in this country.

The author, Mrs. Vera Micheles Dean, the distinguished authority on international affairs, is excellently qualified to give an appraisal of Russia's part in the war and in the peace to follow. Being herself a native of that country, whence she emigrated to the United States during the turmoil of World War I and the Revolution, Mrs. Dean's understanding of the psychology and the motivating force of the U. S. S. R. is very profound.

Of particular interest to military men is Mrs. Dean's appraisal of the strength of the Russian Army, Soviet war material, and the industrial bases in the Urals.

MACHINE WARFARE

An Inquiry Into the Influences of
Mechanics on the Art of War

BY MAJOR GENERAL J. F. C. FULLER

184 Pages . . . Hutchinson & Co., Ltd.,
London, New York, Melbourne.

Major General J. F. C. Fuller, C. B., CBE., DSO., a veteran of the Boer War and of the World War, has long been distinguished as an authority on military history and the theory and practice of modern warfare. In a long series of books and articles published since the last war, General Fuller has never ceased to urge upon Great Britain the necessity of an adequate air force and modern mechanization of the army, for "manpower," he says, "is no match for machine power." In his latest book he summarizes his views on machine warfare, most of which have already appeared in his writings previous to 1939.

The work is divided into three parts. Part I is a discussion of "Machine Warfare in Development" which draws heavily upon Lewis Mumford's *Technics and Civilization*. Part II, "Machine Warfare in Theory," attempts to develop general principles upon which modern mechanized warfare is based. In Part III, "Machine Warfare in Practice," these general principles are discussed in relation to actual experience, with examples drawn from campaigns of recent wars and of the present war down to November, 1941. The book is filled with thought-provoking comments on warfare in its modern form. "This is a book of ideas as well as of machines," says General Fuller, and the ideas, philosophy, and interpretation of history which the author freely introduces will not meet with every reader's approval. This, however, should not be permitted to distract attention from the real value of the work as a discussion of the utilization of machinery in modern warfare.

Library Bulletin

BOOKS ADDED TO THE LIBRARY SINCE FEBRUARY 1943

- American Men of Science.** A biographical directory.
- BISHOP, GLENN A. & GILBERT, PAUL T. — **Chicago's accomplishments and leaders.**
- BOYAN, EDWIN ARTHUR. — **Handbook of war production.**
- BROOKS, WILLIAM E. — **Grant of Appomattox:** A study of the man.
- BROWN, FRANCIS. — **The war in maps.** An atlas of the New York Times maps.
- CHRISTIAN, JOHN LEROY. — **Modern Burma:** A survey of political and economic development.
- DALLIN, DAVID J. — **Soviet Russia's foreign policy, 1939-42.**
- FALK, EDWIN A. — **From Perry to Pearl Harbor.** The struggle for supremacy in the Pacific.
- FROMM, BELLA. — **Blood and Banquets.** A Berlin social diary.
- GANDHI, MAHATMA. — **My appeal to the British.**
- GREW, JOSEPH C. — **Report from Tokyo.** A message to the American people.
- HEMINGWAY, ERNEST (Edited by). — **Men at war.** The best war stories of all times.
- HERSEY, JOHN. — **Into the valley.** A skirmish of the marines.
- HOLLAND, CECIL FLETCHER. — **Morgan and his raiders:** A biography of the Confederate general.
- HOOPER, A. — **A mathematics refresher.**
- HUIE, WILLIAM BRADFORD. — **The fight for air power.**
- Identification.** The world's military, naval & air uniforms, insignia & flags.
- INFANTRY SCHOOL. — **Mailing list.** Vols. XXII & XXIV.
- JANSEN, JON B. & WEYL, STEFAN. — **The silent war.** The underground movement in Germany.
- KNAPLUND, PAUL. — **The British Empire 1815 - 1939.**
- LENGYEL, EMIL. — **Siberia.**
- MARKS, STANLEY J. — **The bear that walks like a man.** A diplomatic & military analysis of Soviet Russia.
- MASSOCK, RICHARD G. — **Italy from within.**
- MCCLOSKEY, RICHARD GORDON. — **Map & aerial photograph reading.** Complete.
- MCINNIS, EDGAR. — **The war:** Third year.
- OECHSNER, FREDERICK. — **This is the enemy.**
- Orders.** Command and General Staff School, 1941.
- PENNINGTON, L.A., HOUGH, R.B. & CASE, HARRY W. — **Psychology of military leadership.**
- PRATT, FLETCHER. — **The navy has wings.**
- Production Year Book.** Seventh annual. Advertising and publishing.
- ROMMEL, MAJOR GENERAL ERWIN. — **Problems for the platoon and company.**
- ROMULO, COLONEL CARLOS P. — **I saw the fall of the Philippines.**
- THOMPSON, J.E. — **Mathematics for self-study.** Five volumes.
- TREGASKIS, RICHARD. — **Gaudalcanal diary.**
- United States Code Annotated.** Constitution of the United States.
- United States Code Annotated.** Title 45: Railroads.
- United States Hydrographic Office. — **Mediterranean pilot.** H.O. Nos. 151, 152, 153.
- VILFROY, DANIEL. — **War in the West.** The battle of France May - June 1940.
- Who Was Who in America.** Biographies of the non-living with dates of deaths appended.
- WOLFERT, IRA. — **Battle for the Solomons.**
- You, Me—and this war.** A critical account of some problems in Australia's organization for defence.

Directory of Periodicals

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Catalog of Selected Periodical Articles

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AERO DIGEST
February 1943
OUR PRESENT CARGO PLANE SITUATION. Leslie V. Spencer

AEROPLANE (Great Britain)
January 1943
AIRCRAFT CARRIERS OF THE COMBATANTS

AIR FORCE
March 1943
THE MEANING OF FLIGHT CONTROL. Lieut. Colonel George C. Price
CAMOUFLAGE IS A MUST. Lieutenant George Bradshaw
OBSERVATIONS ON THE RUSSIAN FRONT. Major John C. Henry

ARMY DENTAL BULLETIN
[Supplement to the Army Medical Bulletin]
January 1943
ADMINISTRATIVE NOTES FROM THE DENTAL DIVISION
OFFICE OF THE SURGEON GENERAL. THE DENTAL
CORPS' OPPORTUNITY
CHANGE IN DENTAL REQUIREMENTS

AN COSANTOIR (Ireland)
January 1943
DISPATCH RIDERS AND MOTOR CYCLE SCOUTS. Sergeant Patrick Brennan
TERRAIN EXERCISES. Colonel T. Fox

DEFENSA (Mexico)
October, November, December, 1942
HOW DID THE FRENCH ARMY GO TO PIECES? A
POLITICO-MILITARY STUDY OF AN EPISODE OF THE
PRESENT CONFLICT.
[Como Se Desmoronó el Ejército Francés? Estudio
Político-Militar Sobre un Episodio de la Contienda
Actual.] Por el Mayor José Guarnier

THE TANK.
[El Tanque.] Capitán Julio Monroy Aguilar
REQUIREMENTS OF RAILWAY ARTILLERY.
[Necesidades de la Artillería Sobre Vía Férrea.] Por
el Coronel Luis Florez

CATALOG OF SELECTED PERIODICAL ARTICLES

CHEMICAL ATTACKS. THE GAS MASK FILTER.
[La Agresión Química. El Filtro de la Mascara Antigás.]
Por el Tte. Corl. Agustín Ripoll

EMPLOYMENT OF ARTILLERY AGAINST AIRCRAFT.
[Emploio de la Artillería Contra Aeronaves.] Por el Coronel Enrique Florez

A DEFESA NACIONAL (Brazil) November 1942

GETTING SUPPLIES TO THE LARGE MECHANIZED UNITS DURING THE COURSE OF OPERATIONS.
[Reaprovisionamento das G.U. moto-mecanizadas, no decurso das operacoes.] Alencar Lima

REFLECTIONS CONCERNING THE DOCTRINE OF THE EMPLOYMENT OF MOTORIZED VEHICLES.
[Reflexões sobre a Doutrina do Emprego dos Carros de Combate.] Major Olimpio Mourao Filho

DEUTSCHE WEHR (Germany) 24 December 1942

THE 1942 EASTERN CAMPAIGN IN RETROSPECT.
[Rückblicke auf den Ostfeldzug 1942.]

THE FRENCH FLEET AND ENGLAND.
[Die französische Flotte und England.]

ALGERIA AND TUNISIA.
[Algerien-Tunesien.]

CHUNGKING CHINA TURNS TO THE NORTHWEST.
[Tschungking-Chinas Ruck nach Nordwesten.]

THE SOVIET UNION AND ITS WEAPONS.
[Die Sowjetunion und ihre Waffen.]

TECHNICAL AIDS FOR THE DIVE BOMBER.
[Technische Hilfsmittel für den Stukaflieger.]

METALS AS ECONOMIC FACTORS IN WAR.
[Metalle als Wehrwirtschaftsfaktoren.]

ERJECITO (Spain) January 1943

INCENDIARY ATTACKS.
[La agresión incendiaria.] Capitán de Artillería Carlos Paz Losada

MIXED CAVALRY REGIMENTS.
[Regimientos Mixtos de Caballería.] Comandante de Caballería Joaquín de Sotto Montes

ARTILLERY SERVICE IN THE CORPS AND DIVISION.
[El Servicio de Artillería en el C.E. y la División.] Comandante de Artillería Javier Ayensa Rizzo

MILITARY ORGANIZATION OF THE REAR GUARD.
[Organización Militar de la Retaguardia.] Teniente de Artillería Gabriel Pou Ferrer

MILITARY DENTISTRY.
[La Odontología Militar.] Comandante Medico F. Mallol de la Riva

FIELD ARTILLERY JOURNAL March 1943

MOUNTAIN JAEGER IN THE CONQUEST OF CRETE, MAY 1941

THE BRITISH 6-POUNDER

GERMAN ARMORED FORMATIONS IN LIBYA. Colonel H. B. Latham

ARTILLERY IN TANK SUPPORT. By "Sarkie"

SOVIET MOTOR MAINTENANCE ON WINTER MARCHES. T. Varshavski

ORGANIZATION OF THE GERMAN DEFENSE. Major C. Lopatin

ARTILLERY OF A GERMAN TANK DIVISION. As Reported in Red Star

ANTITANK THOUGHTS. Colonel M. J. Colbuck

RAPID CAMOUFLAGE. Lieutenant Daniel H. Sherman

THE EMPLOYMENT OF CORPS ARTILLERY. Colonel John J. Burns

NAVAL GUNFIRE IN SUPPORT OF LANDING OPERATIONS. Lieutenant Robert H. Bingham and Ensign Herbert C. Manning

INFANTRY JOURNAL March 1943

INDIAN FIGHTING

JUNGLE WAR

UNARMED OFFENSE. Part One. Captain Rex Applegate

PSYCHOLOGY FOR THE FIGHTING MAN

NITROGEN MUSTARD GASES. Brigadier General Alden H. Waitt

THE RIFLE COMPANY. Part Three: Offensive Combat

BATTLE TRAINING. Part One. Colonel John U. Ayotte

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS (Great Britain)

INCENDIARY, TRACER AND EXPLOSIVE BULLETS. Major J. R. Cameron

THE COMMON ILLS OF THE SOLDIER

DECK ANKLES. Captain W. F. L. Fava

MILITARWISSENSCHAFTLICHE MITTEILUNGEN (Austria)

December 1942

WAR AND MOUNTAINS.
[Krieg und Gebirge.]

MILITAR-WOCHENBLATT (Germany) 25 December 1942

DAYS OF WAR IN THE UKRAINE.
[Kampftage in der Ukraine.]

GERMAN SOLDIER, FLAME THROWERS FORWARD!
[Deutsches Soldatentum. Feuerwerfer vor.]

GENERAL VON SEECKT AND THE REICHSWEHR.
[Generaloberst von Seeckt und die Reichswehr.]

MINE HUNTING, MINE SWEEPING AND CONVOY SERVICE.
[Minensuch-, Minenräum- und Geleitsdienst.]

AA DEFENSE IN OTHER COUNTRIES WITH MULTI-TUBE MACHINE GUNS.
[Flugabwehr im Ausland mit Maschinenwaffen in Mehrfachlafetten.]

FRENCH NORTHWEST AFRICA. THE TERRAIN AND INDUSTRIES.
[Französisch-Nordwestafrika. Die Landschaft und die Wirtschaft.]

MILITARY ENGINEER March 1943

"HELL-BUGGIES" AND THE ENGINEER. Lieutenant Loren Oscar Brodahl

THE SHOFU CYLINDER. A JAPANESE METHOD OF WATER FILTRATION IN THE FIELD. Captain Richard D. Kirkpatrick

ASSAULT METHODS OF SOVIET ENGINEERS. A. Khrenov

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Aero Dig = Aero Digest
Aero = Aeroplane (Great Britain)
Air Force = Air Force
A Den Bul = Army Dental Bulletin
An Cos = An Cosantoir (Ireland)
Defensa = Defensa (Mexico)
Def Nac = A Defesa Nacional (Brazil)
Deut Wr = Deutsche Wehr (Germany)
Ejercito = Ejercito (Spain)
FA Jour = Field Artillery Journal
Inf Jour = Infantry Journal
Jour RAMC = Journal of the Royal Army Medical Corps
Mil Mitt = Militärwissenschaftliche Mitteilungen (Austria)
Mil-Woch = Militär-Wochenblatt (Germany)
Mil Eng = Military Engineer

Mil Surg = Military Surgeon
Nav Inst Proc = Naval Institute Proceedings
Panzer = Die Panzertruppe (Germany)
Penn Guard = Pennsylvania Guardsman
QM Rev = Quartermaster Review
Tank = The Tank (Great Britain)
Die Wehr = Die Wehrmacht (Germany)

Lib = Liberty
Life = Life
Nat Geog = National Geographic Magazine
Sat Eve Post = Saturday Evening Post
Sci Dig = Science Digest
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Amer For Serv = American Foreign Service Journal
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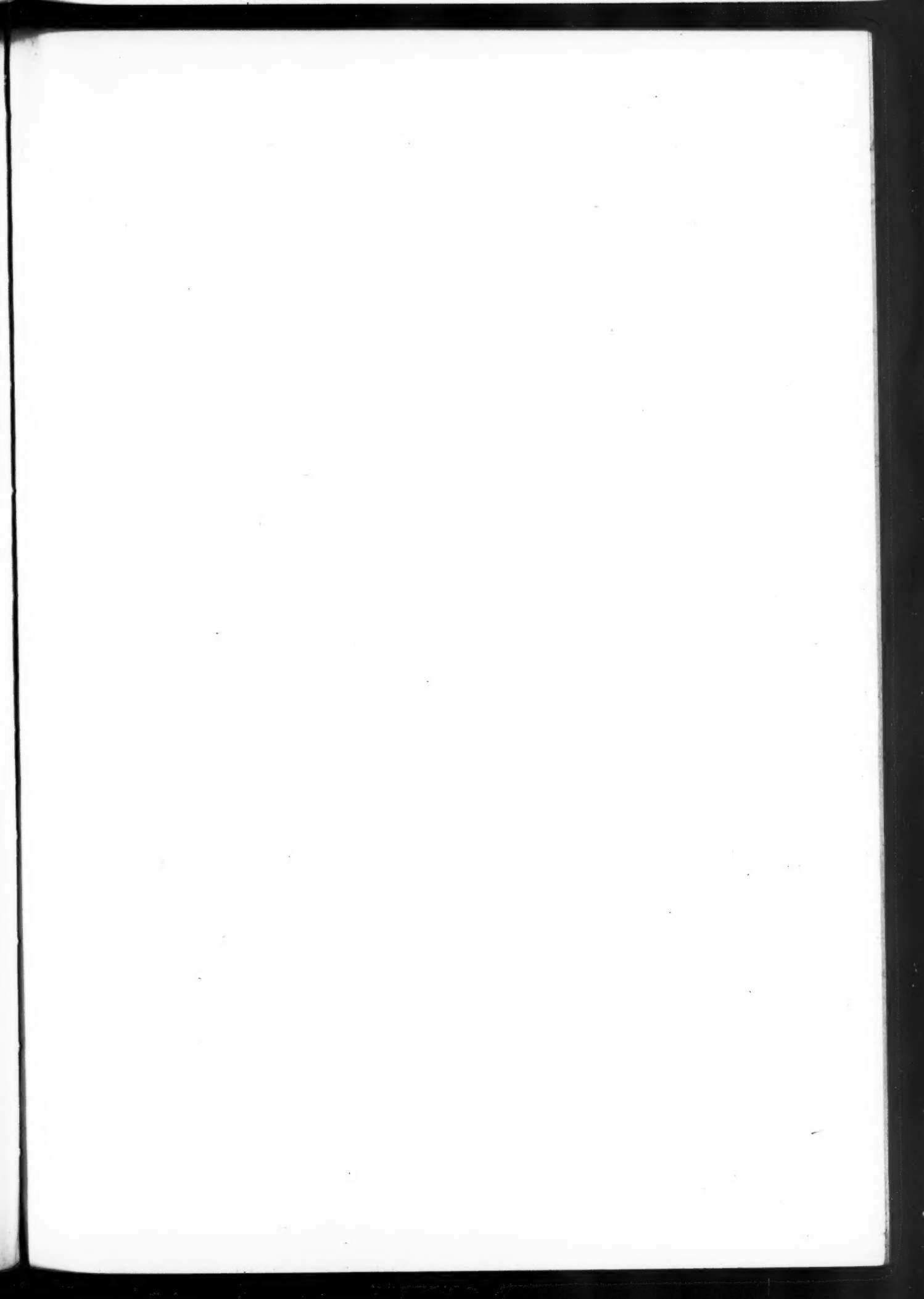
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